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H. B. McMEAL, PRESIDENT AND EDITOR — F. S. KENFIELD, VICE-PRESIDENT — H. D. FARGO, SECRETARY AND TREASURER
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A. T. & T. Co.—Government Agreement.

Everybody connected with the telephone industry should not fail to study carefully the terms of the agreement which the Bell interests are prepared to make with Independent companies relative to long distance and toll connections. Under the supervision of the federal government, the two forces engaged in the business of furnishing telephone service to the people of the United States have finally reached the point of negotiation on this important matter.

In Chicago, March 16, the proposed agreement, which has been endorsed by the government, was formally submitted to the board of directors of the National Independent Telephone Association. After much discussion and careful consideration, the directors commended the terms of the proposal as being fair and equitable, leaving, however, its acceptance a matter for each individual company to decide for itself.

The text of the agreement, with the accompanying forms, and the resolution adopted by the directors will be found on other pages of this issue of TELEPHONY, and deserve the earnest attention of every man holding a position of authority in a telephone company. The submission of the proposition marks an important epoch in telephone history. It forms a part of the evolution which the industry has been experiencing during recent years and undoubtedly will lead to an adjustment which will mean more stability and a more permanent prosperity for the business in the years to come.

In considering the proposition, the fact should not be overlooked that the agreement bears the stamp of approval of the federal authorities at Washington who have had the telephone situation in hand. The attorney general's office officially passed upon the agreement, and President Wilson and his cabinet have signified their approval of its general terms. The board of directors of the National Independent Telephone Association, therefore, in voting to commend the agreement as being fair and equitable have shown their support of the national administration. No complaint can be made that the directors have sought to commit any company in the field, to the proposition, as the recommendation is specifically made that each individual company should consider and act exactly as it affects its peculiar local condition.

On Saturday, March 14, the directors of the Independent Telephone Association of America, considered this agreement and deferred action. Thus this vital matter is now before the entire telephone field. As vice-president N. C. Kingsbury, of the American Telephone & Telegraph Co., who presented the agreement to both associations, stated at both meetings, it is not a matter that the Bell is urging other companies to accept. The federal authorities decreed that the Bell lines were common carriers and much be thrown open to all telephone companies. The terms under which such connections may be effected, as outlined in this agreement, have been dictated by the government. Now it is up to the companies to decide whether they care to apply for a contract to secure long distance connections.

In connection with this stage of the developments, a table of telephone statistics, prepared by the American Telephone & Telegraph Co., which appears on the following page, has an important bearing. Reference to these figures will show, at a glance, the number of telephone companies operating switchboards in the United States and their different classifications. It will be seen there are 1,864 points in the country to be affected by the proposed agreement—1,234 towns where there are Bell and Independent exchanges in competition with each other, and 630 towns where Independents are in competition with other Independent (Mutual) concerns. Strictly speaking, then, the agreement will apply to only 1,234 Bell vs. Independent competitive points.

TELEPHONY believes this agreement will work out in a satisfactory way to all parties of interest, and will eventually solve most of the vexing problems that have confronted us in the past, provided the matter is approached in the proper spirit and worked out in a fair and equitable way.

Statistics of Telephone Service in the United States

Division and State.	Single Service Points. Bell.	Connecting.	Independent.	Total.	Dual Service Points. Bell and Independent.	Connecting and Independent.	Total.	Grand Total.
New England.								
Maine	96	111	23	230	18	15	33	263
New Hampshire	80	36	7	123	13	2	15	138
Vermont	51	70	14	135	6	8	14	149
Massachusetts	243	18	5	266	3	1	4	270
Connecticut	67	5	....	72	....	....	....	72
Rhode Island	25	3	....	28	....	....	....	28
Total	562	243	49	854	40	26	66	920
Eastern.								
New York	322	362	92	776	89	28	117	893
New Jersey	144	26	6	176	37	2	39	215
Pennsylvania	160	200	223	583	240	92	332	915
Delaware	23	2	1	26	1	....	1	27
Maryland	98	35	5	138	5	....	5	143
Virginia	59	219	28	306	3	3	6	312
West Virginia	45	152	84	281	29	30	59	340
Total	851	996	439	2,286	404	155	559	2,845
Central.								
Ohio	72	549	251	872	112	43	155	1,027
Indiana	87	603	136	826	49	18	67	893
Illinois	177	738	175	1,090	72	92	164	1,254
Michigan	130	237	140	507	76	58	134	641
Wisconsin	82	415	64	561	16	18	34	595
Total	548	2,542	766	3,856	325	229	554	4,410
Southern.								
Kentucky	120	173	95	388	55	13	68	456
Tennessee	108	120	95	323	52	8	60	383
North Carolina	70	231	28	329	6	7	13	342
South Carolina	54	130	9	193	1	....	1	194
Georgia	100	293	13	406	1	1	2	408
Florida	10	93	3	106	....	....	....	106
Alabama	73	190	9	272	4	2	6	278
Mississippi	119	68	29	216	14	1	15	231
Louisiana	92	60	2	154	5	2	7	161
Total	746	1,358	283	2,387	138	34	172	2,559
Northwestern.								
Minnesota	55	392	64	511	48	9	57	568
North Dakota	58	263	....	321	1	1	2	323
South Dakota	27	223	18	268	....	21	21	289
Iowa	146	794	35	975	14	6	20	995
Nebraska	86	404	24	514	8	18	26	540
Total	372	2,076	141	2,589	71	55	126	2,715
Southwestern.								
Missouri	65	860	92	1,017	41	48	89	1,106
Kansas	73	632	55	760	15	24	39	799
Oklahoma	118	429	....	547	6	3	9	556
Arkansas	99	186	50	335	4	7	11	346
Texas	211	603	143	957	68	30	98	1,055
Total	566	2,710	340	3,616	134	112	246	3,862
Mountain.								
Montana	25	44	10	79	21	....	21	100
Idaho	54	35	15	104	17	2	19	123
Wyoming	23	22	7	52	2	....	2	54
Colorado	146	56	4	206	6	....	6	212
Utah	38	28	....	66	....	....	....	66
New Mexico	27	33	5	65	....	....	....	65
Arizona	27	18	11	56	....	....	....	56
Total	340	236	52	628	46	2	48	676
Pacific.								
Washington	77	158	6	241	24	7	31	272
Oregon	63	142	14	219	7	9	16	235
Nevada	4	17	12	33	....	1	1	34
California	336	173	11	520	45	....	45	565
Total	480	490	43	1,013	76	17	93	1,106
United States	4,465	10,651	2,113	17,229	1,234	630	1,864	19,093

The figures in the first column give the points where only the Bell companies furnish service; the second column, the points where service is provided by Independent companies having connections with the Bell System; the third column, the points where service is furnished only by Independent companies; the fifth column gives the figures as to points where the Bell and Independent companies have competing exchanges; and the sixth column, points where connecting, Mutual or Independent companies have competing exchanges. There are therefore 1,864 points where there are two exchanges, making a grand total of 20,957 telephone exchanges in the United States.

Bell Company Submits Form of Contract to Independents

Full Text of the Contract Offered by the American Telephone & Telegraph Co., in Accordance with Its Agreement with the Department of Justice to Furnish Toll Service to Independent Telephone Companies Throughout the United States

In conformity with the agreement reached with the United States Department of Justice, that the American Telephone & Telegraph Co. dispose of its holdings in the Western Union Telegraph Co., and open its toll lines to Independent telephone companies, N. C. Kingsbury, vice-president of the A. T. & T. Co., has made public the form of contract for the latter requirement which has been dictated by the U. S. attorney general. The draft of the contract for the furnishing of qualified toll line service to certain Independent companies is published below in full for the benefit of TELEPHONY's readers:

This agreement, made this.....day of..... 19...., by and between the.....Telephone Co., a corporation of the state of.....(hereinafter called the "Bell company"), party of the first part, and the.....Telephone Co., a corporation of the state of.....(hereinafter called the "Subscribing company"), party of the second part:

WITNESSETH: Whereas, the Bell company now operates for itself, in connection with certain exchanges and toll line systems operated by connecting companies in its territory, a telephone exchange and toll line system connecting with the toll line system of the American Telephone & Telegraph Co., and the exchange and toll line systems of said American Telephone & Telegraph Co.'s other associated companies and their connecting companies in the respective territories of such associated companies, all of such systems together constituting the general exchange and toll line system commonly known as the "Bell System," and

Whereas, the subscribing company now maintains and operates for itself, in the same territory in which the Bell company operates its exchange and toll line system, a public commercial telephone exchange or public commercial telephone exchanges, independent of and disassociated from the Bell System, and desires to secure for its subscribers in its exchange, or exchanges, certain toll line service to and from points on the Bell System, and to that end to connect its exchange or exchanges with the switchboard of an exchange or the switchboards of exchanges of the Bell company, and the Bell company is willing to permit such connection or connections under the terms and conditions of this agreement;

Now, Therefore, in consideration of the premises and of the premises and agreements hereinafter contained, the parties aforesaid do hereby agree as follows:

The Bell company will, upon receipt, from time to time during the continuance of this agreement, of a written application from the subscribing company in the form hereto annexed marked "A" and properly filled out:

ARTICLE I.

1. Permit the subscribing company to directly connect, as hereinafter provided, the switchboard of any public commercial telephone exchange then maintained and operated by the subscribing company in the territory in which the Bell company operates, and specified in such application, with the switchboard designated by the Bell company of an exchange of the Bell company (hereinafter termed a "connecting exchange") nearest such exchange of the subscribing company and specified in such application, for the purpose of enabling the subscribing company through such interconnection to secure for its subscribers and other patrons in such exchange the qualified toll line service defined in Section 3 of Article III hereof, to and from points outside of such connecting exchange of the Bell company and reached over its toll lines or the toll lines of the American Telephone & Telegraph Co., and its associated companies and their connecting companies; provided, however, that the trunk lines connecting such exchange of the subscribing company with such connecting exchange of the Bell company shall be supplied and maintained by the subscribing company from the switchboard of such exchange of the subscribing company either up to such a point on or near the premises of the Bell company in such connecting exchange or up to such other point nearer such exchange of the subscribing company, as the Bell company may elect and in either case designate; the construction and maintenance of the requisite wiring to complete the connection of such trunk lines with the switchboard of such connecting exchange to be done by the Bell company.

2. Furnish its facilities for the interchange of telephonic communications through such connecting exchanges, and make the proper switchboard, or other connections, and promptly perform the necessary operating to permit of direct communication, as herein provided, between the subscribers and other patrons of the subscribing company in any exchange of the subscribing company, connected, as herein provided, with a connecting exchange of the Bell company, and the subscribers and other patrons of the Bell company, and of the other com-

RESOLUTION OF DIRECTORS OF NATIONAL ASSOCIATION, ADOPTED MARCH, 16, 1914.

Whereas, the directors of the National Independent Telephone Association have carefully read the proposed contract under which the Bell companies will furnish the Independent companies of the United States connection for toll service and also the letter of Mr. Kingsbury to the Attorney General of the United States, of the date of December 19th, 1913, and find that in our best judgment the contract clearly and fairly in its details carries into effect the spirit of that letter.

And Whereas, the agreement applies generally to competing companies, it being our understanding that all companies not competing with the Bell company may connect up for all toll business on the usual terms as to commissions, etc.

And Whereas, the acceptance or rejection of the agreement is left to each individual Independent company.

And Whereas, this association has no authority to enter into any contract that will bind its members therefor,

Be It Resolved, that this association commend the agreement as being fair, leaving the question as to whether it should be entered into by Independents to each individual company to be determined solely by the advantage or disadvantage that such company will receive from the connection.

panies in the Bell System, and also the subscribers and other patrons in any exchange now or hereafter connected, under an agreement similar hereto, with a connecting exchange of the Bell company or with a connecting exchange of any other company in the Bell System, subject to the limitations and charges specified in Sections 3 and 4 of Article III hereof.

3. Answer promptly at all times any inquiries with reference to the rate for any contemplated call to be originated, or the elapsed time or charges on any completed call originating, at any exchange of the subscribing company connected, as herein provided, with a connecting exchange of the Bell company, and render monthly to the subscribing company a statement showing, in sufficient detail to enable the subscribing company to properly bill its subscribers, the amounts due for or on account of all tolls and other charges for communications interchanged hereunder and originating in each such exchange of the subscribing company during the monthly period covered by the statement.

ARTICLE II.

The subscribing company will:

1. Supply and maintain, in accordance with the provisions of Section 1 of Article I hereof and hereafter provided, all trunk lines connecting hereunder the switchboard of an exchange of the subscribing company with the switchboard of a connecting exchange of the Bell company; the switchboard of each central office in any exchange of the subscribing company, connected hereunder with a connecting exchange of the Bell company and having two or more such offices serving the subscribers of the subscribing company in such exchange, to be directly connected by trunk lines with the switchboard of such connecting exchange, and all trunk lines so supplied and maintained hereunder by the subscribing company to be of the so-called metallic circuit type, and to be so equipped and arranged as to be appropriate to the system by which, in each case, is operated the Bell company's connecting exchange with which such trunk lines are connected. It will, in every case, locate, construct, equip, maintain and operate such trunk lines so as not to endanger the plant of the Bell company in the connecting exchange and so as to maintain at all times a proper quality of service thereover, and will, furthermore, constantly provide a sufficient number of trunk lines in each case reasonably to accommodate the telephone traffic thereover.

2. Make the proper switchboard connections and promptly perform the necessary operating to permit the Bell company's operators to establish direct communication, as herein provided and subject to the provisions of Section 2 of Article III hereof, between the subscribers and other patrons in any exchange of the subscribing company, connected, as herein provided, with a connecting exchange of the Bell company, and the subscribers and other patrons of the Bell company and of the other companies in the Bell System, and also the subscribers and other patrons in any exchange then connected, under an agreement similar hereto, with a connecting exchange of the Bell company or of any other company in the Bell System, subject to the limitations and charges specified in Sections 3 and 4 of Article III hereof. It will not, except as herein provided, connect the toll lines of the Bell company with the exchange or toll line of any individual, firm or corporation other than an exchange of the subscribing company connected hereunder by its trunk lines with a connecting exchange of the Bell company.

3. Adopt and observe, in the handling of interchanged telephonic communications, and require its subscribers to observe, such rules and regulations as the Bell company may from time to time make for the use of its lines.

4. Supply, without charge, at the request of the Bell company, one copy of each issue of the subscribing company's telephone directory for each exchange of the subscribing company connected, as herein provided, with a connecting exchange of the Bell company, and at its option furnish the Bell company with the same information as to changes in or additions to the directory listings for each such exchange of the subscribing company as it furnishes from time to time to its information operator in each such exchange.

5. Pay monthly all tolls and other charges for communications interchanged hereunder and as herein provided, and originating in each exchange of the subscribing company connected, as herein provided, with a connecting exchange of the Bell company, and, within 15 days after the receipt by the subscribing company of a statement of account of such tolls and other charges, remit to the Bell company, at its office in an exchange designated by the Bell company for that purpose and specified in the application made hereunder for such exchange of the subscribing company, all sums due to the Bell company for or on account of all such communications transmitted during the month covered by the statement.

ARTICLE III.

It is mutually agreed by the parties hereto:

1. For the purposes of this agreement, an "exchange" of the subscribing company means a system consisting of a switchboard, or switchboards, in the case of a multi-office exchange, which has been or may be connected, as herein provided, by trunk lines with a switchboard, designated by the Bell company, of a connecting exchange of the Bell company and also connected with the stations of subscribers in such exchange of the subscribing company at the exchange rate in such exchange, including therein local public telephone pay stations. No station to which the subscribing company makes a toll charge for connection with an exchange of the subscribing company (except local public telephone stations as above included) shall be considered under this agreement as within that exchange. This agreement contemplates, however, that a toll station of the subscribing company may, in some cases, be connected with an exchange of the Bell company only by special agreement in each case, and that each such toll station which it is desired to connect with an exchange of the Bell company shall be deemed an exchange, for the purposes of this agreement, and treated hereunder in all respects accordingly.

2. In the handling of all communications interchanged hereunder and as herein provided, the Bell company shall at all times make the toll line connections desired by the subscribing company and operate, control and supervise the operation of the entire toll circuit involved in establishing such connections, and the subscribing company shall only be required to make such switchboard connections, and to perform such operating of the switchboard of each of its exchanges connected, as herein provided, with a connecting exchange of the Bell company, as may be requisite to connect the stations of its subscribers in such exchange with the switchboard of such connecting exchange of the Bell company.

3. No interchange of telephonic communications shall be required or permitted hereunder in either direction between the subscribers of the subscribing company in any exchange connected, as herein provided, with a connecting exchange of the Bell company and the subscribers in any other exchange reached by the lines of the Bell company and located within a radius of 50 miles from such exchange of the subscribing company, measured by the air line distance between such exchange of the subscribing company, and the exchange serving the subscriber called or calling; such measurements to be made on the post route maps published by the United States Post Office Department and between the points indicated on such maps as the localities in which such exchanges are respectively located; provided, however, that the Bell company will, upon request, accept "long lines business" without limitation as to distance and without the connection charge hereinafter specified. "Long lines business" means these connections classified as such in accordance

with the contracts and traffic arrangements between the American Telephone & Telegraph Co. and its associated companies as applicable on the 19th day of December, 1913, to any connecting exchange contemplated hereby.

4. The tolls for all communications interchanged hereunder and originating at an exchange of the subscribing company connected, as herein provided, with a connecting exchange of the Bell company shall belong to the Bell company and shall be as follows:

For all such communications to subscribers served by any exchange located at a distance of 50 miles or more, measured as hereinbefore provided, from such exchange of the subscribing company and reached over the toll lines of the Bell company, the regular tolls, between the exchanges in which, in each case, such communications originate and terminate, from time to time established by the Bell company and, in addition thereto, a connection charge of ten cents for each such communication, to be paid by the subscribing company to the Bell company; for all such communications classified, as hereinabove provided, as "long lines business," whether to a point located within or beyond a radius of 50 miles from such exchange of the subscribing company, the regular tolls from time to time established therefor by the American Telephone & Telegraph Co., and without any connection charge in addition to such tolls.

The tolls for all communications interchanged hereunder and originating on the lines of the Bell System and at any exchange connected, under an agreement similar hereto, with any connecting exchange of the Bell company or of the other companies in the Bell System, and terminating in any exchange of the subscribing company connected, as herein provided, with a connecting exchange of the Bell company, shall belong to the Bell company, and shall be the regular tolls aforesaid properly applicable to such communications and, in addition thereto, a connection charge of ten cents for each such communication, to be paid by the subscriber originating the call and to be retained by the Bell company, whenever a connection charge, in addition to the regular toll, would be chargeable hereunder to the subscribing company if such communication had originated at the station of the subscriber called. Calls on which charges are reversed, if and when such calls are permitted by the established rules and regulations of the Bell company, shall be considered, for the purpose of this agreement, as originating at the station against which the charge is to be made, and shall be subject to the limitations and charges specified in this Section and in the next preceding Section 3 hereof.

5. A separate application, in the form hereto annexed marked "A" (application for qualified toll line service), shall be made by the subscribing company for each exchange which it may desire to connect hereunder with an exchange of the Bell company. The requisite information to enable the subscribing company to properly fill out each such application will be furnished by the Bell company whenever requested by the subscribing company.

6. The Bell company shall not in any event be liable to the subscribing company for any accidents, damages, losses or costs incurred at, on or in connection with the plant of the subscribing company in any exchange connected, as herein provided, with a connecting exchange of the Bell company, or for the quality of the service, or for the failure of any conversation for any cause whatsoever, resulting from such connection and not due to the negligence of the Bell company, and, whenever in any case such a plant of the subscribing company is not maintained in a condition to afford efficient service over the trunk lines connecting it hereunder with such connecting exchange of the Bell company, the Bell company may discontinue the service until the defective condition is remedied.

7. Should any differences hereafter arise under this agreement concerning any of the matters provided for in Section 1 of Article II and in the next preceding Section 6 hereof, which affect or involve the efficiency of the service rendered through the connection afforded by the subscribing company's trunk lines connecting hereunder any exchange of the subscribing company with a connecting exchange of the Bell company, the subject of any such difference shall be referred to arbitration; one arbitrator shall be chosen by the Bell company, one by the subscribing company, and a third, who shall be a competent and disinterested party, by the two so chosen. If either company shall fail to appoint its arbitrator within 15 days after the company desiring arbitration has appointed its arbitrator and given written notice to the other of such appointment and of the matter to be arbitrated, then the company desiring arbitration shall appoint an arbitrator for the one in default, and the two so appointed shall select a third arbitrator. If the two arbitrators chosen in either of said ways shall fail, within 15 days after their appointment, to choose a third arbitrator, then such third arbitrator may be selected by the chairman of the state commission or other state board, if any, having supervision over telephone companies in the state in which the subscribing company operates any such exchange, or, if there should be no such commission or board in that state, then such third arbitrator may be selected by the chairman of the Interstate Commerce Commission. The decision of said arbitrators, chosen in any of said ways, or that of a majority of them, shall be final and conclusive. The expense of such arbitration shall be paid by the company against which the arbitrators decide. If their decision is partly against one and partly against the other, the arbitrators shall direct the proportionate distribution of the expense.

8. If the subscribing company shall fail to pay any sum due hereunder within 15 days after the same shall become due or payable and after demand for the payment thereof, or shall violate any of the other provisions of this agreement and such violation shall continue for 30 days after written notice thereof from the Bell company, the Bell company may, at its option, thereupon by written notice terminate this agreement; provided, however, that, in case the subscribing company shall, except as herein provided, connect the toll lines of the Bell company with the exchange or toll lines of any individual, firm or corporation other than an exchange of the subscribing company, connected hereunder by its trunk lines with a connecting exchange of the Bell company, the Bell company shall have the right thereupon to terminate this agreement without notice.

9. Wherever in this agreement notice is provided to be given by either party hereto to the other, such notice shall be in writing and given by letter mailed, or by personal delivery, to the Bell company at its office at ..... or to the subscribing company at its office at ..... as the case may be, or to such address as either party may from time to time designate in writing for that purpose.

10. The failure of either party hereto to enforce or insist upon compliance by the other party of the terms and conditions of this agreement, or the waiver by either party of the same in any instance or instances, shall not be construed as a general waiver or relinquishment on its part of any such terms or conditions, but the same shall be and remain at all times in full force and effect.

11. The covenants and agreements herein contained shall run to and be binding upon the parties hereto, their successors, legal representatives and assigns, and to and upon any other person, firm or corporation which may hereafter own or operate the property of either party.

12. Unless sooner terminated as hereinbefore provided, this agreement shall continue in force for the term of ..... years from and after the date first hereinabove written and thereafter until the expiration of 30 days after notice of

termination given in writing by either party hereto, to the other.

In Witness Whereof the party of the first part has signed its corporate name and affixed its corporate seal and the party of the second part has signed its corporate name and affixed its corporate seal to this agreement in duplicate the day and year first hereinabove written.

.....Company.

By .....

Attest:

Secretary.

.....Company.

By .....

Attest:

Secretary.

Appendix "A."

APPLICATION FOR QUALIFIED TOLL LINE SERVICE.

Pursuant to the agreement for qualified toll line service dated the..... day of....., 19...., between the.....Company (therein and herein called the "Bell company"), and the .....Company (therein and herein called the "Subscribing company") the undersigned hereby applies to the Bell company for permission to connect, for the purposes and in the manner provided in said agreement, the switchboard of the telephone exchange of the subscribing company at.....
.....
with the switchboard of the telephone exchange of the Bell company at.....
.....
and hereby requests the Bell company, upon its acceptance of this application and after the proper completion of the connection herein applied for, to furnish, in accordance with the terms and conditions of said agreement, the qualified toll line service therein provided for.

The subscribing company hereby further requests the **Bell company**.....
.....

All sums payable by the subscribing company to the Bell company, in accordance with the provisions of Section 5 of Article II of said agreement, for telephonic communications originating at the subscribing company's exchange, specified in this application, shall be paid to the Bell company at its office in.....

The annexed schedule is hereby made a part of this application.

The toll line service covered by this application may, without affecting said agreement, be discontinued at any time by 30 days' previous written notice from the subscribing company to the Bell company. But upon the termination of the agreement to which this is supplemental the Bell company shall have the right without notice to discontinue the service covered by this application.

Dated this.....day of....., 19....

.....Company.

By.....

Accepted the.....day of....., 19....

.....

By.....

SCHEDULE.

A. No interchange of telephonic communications will be permitted between the subscribers of the subscribing company in the exchange specified in the within application and the subscribers of the Bell company, of its connecting companies, of the other companies in the Bell System or of companies under agreements, with the Bell company or with the other companies in the Bell System, similar to the agreement under which the within application is made, in any exchange located within a radius of 50 miles, air line distance, from the subscribing company's exchange specified in the within application, except to the exchanges named below and classified as "long distance lines" points, and to which points the American Telephone & Telegraph Company's toll rates will apply without any connection charge:

B. A connection charge of ten cents, in addition to the regular toll, will be made for each communication to an exchange distant 50 miles or more from the subscribing company's exchange specified in the within application, and within .....
.....
except to the exchanges named below and classified as "long distance lines" points, and to and from which points the American Telephone & Telegraph Company's toll rates will apply without any connection charge:

C. No connection charge in addition to the regular tolls will be made for communications to exchanges beyond the limits of the zone described in "B" hereof, except to the exchanges named below and classified as "Bell company" toll line points, and to and from which points the Bell company's toll rates will apply and in addition thereto a connection charge of ten cents for each such communication.

Meeting of Directors of National Association.

The board of directors of the National Independent Telephone Association met at the Congress Hotel, Chicago, March 16. This was the regular quarterly meeting of the directors. In addition to the routine business incidental to the management of the association, consideration was given to the report of a committee appointed January 31, to confer with the officials of the American Telephone & Telegraph Co. in regard to the detailed plan of that company for carrying out the offer to the attorney general of the United States to afford toll line facilities to competing Independent telephone companies.

This committee, consisting of Manford Savage, of Champaign, Ill.; C. E. Tarte, of Grand Rapids, Mich.; C. Y. McVey, of Cleveland, Ohio; Frank L. Beam, of Mt. Vernon, Ohio, and F. B. MacKinnon, of Washington, D. C., reported they had spent three days in New York going over the tentative form of contract with N. C. Kingsbury and his associates; that after a full explanation of the contract and the proceedings that led up to it, the committee had arranged for Mr. Kingsbury to come to Chicago and make a similar explanation to the board of directors at its meeting.

In accordance with this arrangement, therefore, Mr. Kingsbury was invited to explain the terms of the contract, which is given in full on preceding pages of this issue of TELEPHONY. After a careful discussion of all sections of the contract and its application to various situations, the board of directors adopted the resolution which appears elsewhere in this issue.

The directors present were: T. W. Allen, Jackson, Tenn.; J. B. Earle, Waco, Texas; W. C. Handlan, Wheeling, W. Va.; N. G. Hunter, Wabash, Ind.; L. D. Kellogg, Chicago, Ill.; F. B. MacKinnon, Washington, D. C.; H. B. McMeal, Chicago, Ill.; C. Y. McVey, Cleveland, Ohio; J. M. Plaister, Ft. Dodge, Iowa; Warren Pratt, Kearney, Neb.; Manford Savage, Champaign, Ill.; C. E. Tarte, Grand Rapids, Mich.; and H. C. Todd, Marysville, Mo.

New Home of Stantonville Telephone Co., Corinth, Miss.

The Stantonville Telephone Co., of Corinth, Miss., has let a contract for a two-story red pressed brick structure 25x70 ft. in size. The second floor will be occupied by the exchange and home offices of the company. The total improvement contemplated by the company, including an increase in aerial and underground cable will cost about $9,000.

The Rejuvenation of the Craneville Telephone Exchange

A Serial Story Telling How a Rundown Telephone Plant Was Rebuilt, Enlarged and Changed Successively from a Grounded to a Local Battery Metallic System and Later to Common Battery —Problems Encountered by Every Practical Telephone Man

By Paul Hamilton

Nothing unusual occurred during the next week to interfere with the regular routine work. Frank and his two men had kept close upon the heels of the electric light men and fully 75 per cent. of the old drops had been re-run and a large amount of useless iron junk removed. Space had been provided for line wires by putting up ring runs, some of which would later be replaced with cable.

As the installation of lights progressed, the noise on the telephone lines increased, making it necessary to give immediate consideration to cutting the system metallic. This being on Mr. Barrow's mind when they gathered for the regular evening session, he began by saying, as he consulted his book: "We will clean up the two questions the Doctor asked the other day and then devote our attention to the changes necessary to cut the exchange over to metallic.

"The first is not essential to practical telephony but still it is a point well worth knowing. It involves another of the elementary principles of electricity. To explain it fully, I will use this illustration (Fig. 68).

"In this arrangement we have the original plan. It was soon discovered that an equal ratio of current between the receiver and transmitter was not productive of the best results. For illustration: Suppose we are using six volts direct on a transmitter with the receivers in series, we have a direct path for current from one battery to the opposite pole of the other. As I explained before, the receiver diaphragm is actuated not by the pressure or voltage, but by the ampere or current flow through the winding of its coil.

"Now by vibrating the transmitter or controller, suppose we can vary the resistance so as to vary the voltage between six and three volts; that is we reduce the pressure one-half at the starting point. Now when we consider the resistance of the line and exchange equipment, we find that we have reduced it even move than that at the receiving end, so that too frequently insufficient current reaches the distant receiver to reproduce the vibrations of the transmitter.

"To overcome this difficulty, which made long distance service only barely possible, the induction coil was introduced into the circuit (Fig. 69). In other electrical branches, the induction coil is termed a transformer, which is a more explicit name.

"By winding an iron core with insulated wire and connecting a battery in circuit we have a primary coil. Add to this any number of turns of finer wire, close the circuit and you

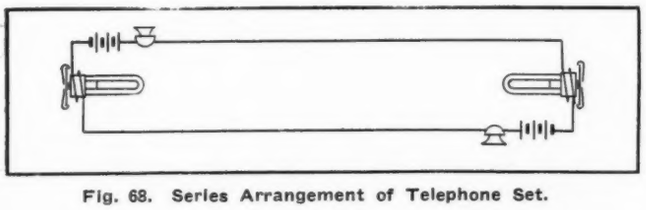


Fig. 68. Series Arrangement of Telephone Set.

have a secondary coil. The two windings are designated as the primary and secondary of the coil. In general practice the secondary has the greater number of turns but this varies in different instruments.

"Now if we substitute a voltmeter for the receiver I have shown (Fig. 69), we will discover a peculiar thing. If the primary circuit is carrying a current of constant voltage, the needle of the meter will remain stationary. Now if you vary the flow of current by vibrating the transmitter diaphragm, the needle will record each fluctuation by vibrating from one polarity to the other, showing that while the current flow in the primary is being increased, the induced current in the secondary is of one polarity and, when decreasing, of the

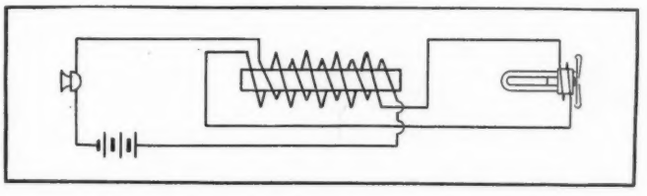


Fig. 69. Simplified Circuit of Induction Coil.

opposite polarity. Therefore we have alternating current in our secondary or receiver circuit."

"How does that increase the efficiency of the receiver? I think you mentioned that point a moment ago," asked the Doctor.

"Efficiency!" came in a gutteral tone from Germany. It brought the eyes of the proprietor full upon the Teuton's face, but the round, honest cherubic expression forestalled any comment.

"I had not intended to get so far into theoretical telephony but I will tell you as briefly as I can. It is one of the unexplained mysteries performed by mechanical application and mathematical exactness. That is, we know if we build a coil of certain dimensions, by a mathematical equation we can determine exactly how it will act under various pressures of voltage or weights of current.

"Again, if we connect a battery of high voltage and low current flow through a primary coil, by winding the secondary in a certain manner, we can reduce the voltage and increase the current or amperage. That is just what we do by using the induction coil in the receiver circuit.

"Now we will take up the one other question in the book, after which we will get to something more practical.

"By practical, just what do you mean?" put in the Doctor, to the manifest annoyance of Frank and Germany.

Mr. Barrows had many times realized that Frank and Germany could not thoroughly appreciate the inquisitive attitude of the young medical student. They did not realize that their education and training had been along exactly opposite lines. He knew the two experienced men could not appreciate the persistent, methodical way the Doctor put his questions. At the same time the Doctor, perhaps unintentionally, appeared to overlook their presence or participation in the discussions.

Mr. Barrows felt that the different human elements could be made of assistance to each other. Therefore he decided, upon the impulse, to digress from the theme under consideration and make a few comments, which he hoped would be for their mutual benefit. He leaned back in his chair, and after a moment's meditation, began:

"Boys, I have something to say to you outside of our regular discussions. We each have our particular accomplishment or talent to which we have been trained. I will begin by speaking of my own training. It has been mostly in the school of experience. My efforts have perhaps been misdirected inasmuch as they have been devoted to no one branch

of the work or to no single locality. As I went along, I managed to gather a general theoretical knowledge to combine with the practical experience. That is one phase of human development.

"Now I will consider Frank and Germany together, for they are of the same school. Their method has been to work, or development has been from practice or experience only. Theories have not come within their grasp, therefore they are excusable for not seeing, immediately, the necessity for them. That is a second and very common phase of human development.

"Now the Doctor represents a third class. He is developing himself through the intellect; that is, by the acquirement of brain-power instead of arm-power. It is a mistaken idea that an education is a memorization of all that books contain upon a certain subject. A college course today is the mere matter of developing dexterity of the brain functions to think; to reason; to develop an idea from a seed-thought; and to make advantageous use of the elements of science by developing theories, much as a shoemaker produces a shoe if the proper tools and materials are placed before him.

"At our early meetings, you boys," speaking to Frank and Germany, "asked questions quite frequently. Of late you have had little to say. You have left it all to the Doctor. You have realized, unconsciously, that your questions do not have the same point to them, and I will admit they don't. But it is through no fault of his nor yours, and for this very obvious reason: He has spent six years in training the nerves and muscles of his brain to work systematically, so to speak. Therefore, it is to be expected that he should be able to put in a single question, all that you could put in half a dozen.

"Now I don't want you boys to lose interest and drop out of this game. Don't let these discussions dwindle into private father and son talks between the Doctor and myself. I want to caution the Doctor to use his training and simplify his questions so they will be a little less logical.

"I have two illustrations of the difference I have been explaining, in mind right now. The last question the Doctor asked was just what I meant by practical. While this is a matter of no great importance, it is a logical or natural question and will serve to illustrate my point.

"The Doctor's words 'just what do you mean by practical' reminds me of mistakes I have made by putting my own construction, or meaning, to instructions given me, which might be construed more ways than one. I have no doubt you all know exactly what I mean by 'practical.' To start building a thought is like building a house—the foundation comes first. If we all have the same mind-picture of the foundation, we can build the walls. Now by 'practical,' I mean the knowledge of that branch of telephony which enables us by mechanical devices to put theory into practice or actual working conditions."

"I suppose that is what we have been doing here?" said Frank.

"Exactly. I hope you will find that what you have learned about the theory of the game, will help in re-arranging the mechanical part to work metallic.

"Now, I am going to moralize a little further. The other illustration I mentioned is the question about why a word continued to retain its identity even through cross talk. I think that was what you meant, wasn't it Doctor?"

"I don't guess I get him right," said Germany.

"I don't guess I do, either," said Frank.

"That's the point I wish to illustrate. The question is one that is seldom answered because it is so seldom asked. Not one practical telephone man in a hundred reasons that far, for the simple reason that they have not been trained, or have not trained themselves to do it. Now, do you boys get what I've been driving at?"

"Is such information essential to the practical telephone man?" the Doctor inquired.

"Wait a minute, Doctor. The boys have a claim in ahead of yours. They say they do not clearly see what the question refers to, or means. I'll try to explain that first.

"Let us suppose I have an egg and I place it on this table, near the edge. A sudden jar causes it to roll off. When it reaches the floor, what happens?"

"It becomes a deformed egg," said the Doctor."

"Just a plain muss," said Frank.

"That's all right. We all know what happens to the egg. Now listen! I take this telephone and by speaking into the transmitter, start electrical impulses traveling over the line which, upon reaching a receiver will produce the word 'hat.' Now in passing through the leaky cable on the roof, they fall or pass from the wire on which they are traveling to another. Now what the Doctor wanted explained, was why the word 'hat' was not knocked out of shape or broken up, the same as the egg in falling from the table."

"It ought to be knocked into a cocked hat," said Frank, whose good nature was fully restored.

"I guess you understand now?"

"It could be split three ways and go into the receiver and come out three hats," the Doctor asserted.

"All different sizes, probably," Germany commented.

"Different shades, at least," said Mr. Barrows. "Now as to whether it is essential for a practical man to know 'why,' I'm going to leave you boys to decide.

"To anticipate a question the Doctor is liable to ask, I am going to first explain sound vibrations. In the first place all sounds have two common factors, tone and pitch. Pitch is determined by the rapidity of vibrations in the air, striking the ear drum, measured by the number per second, and the tone, by the force or strength of the vibrations. Tone, then, is the volume or loudness of sound and decreases as the force of the vibrations is expended.

"I have here, a common tuning fork. By striking it upon the table, I set it in motion or vibration. It gives the pitch *"A."* Now, no matter how hard or how lightly I strike it, it gives the same pitch. When it is first struck you can all hear the tone distinctly. It gradually dies down, but the pitch or key does not change. This shows that the number of vibrations per second does not vary, but they must necessarily grow shorter until they cease entirely. As they become shorter, they have correspondingly less force and the waves created in the air do not travel as far.

"Now we will go back to our word 'hat.' The diaphragm responds to the sound waves thrown against it, vibrating the exact number produced in the air by the voice. The electric current in the circuit fluctuates correspondingly, the number of variations per second never changing until the strength of the current is exhausted. If then there is a leakage of current from one wire to another, the volume or strength may be small but the fluctuations are still exactly the same. If when it finally reaches the winding of a receiver, it still retains strength to enliven the magnet sufficiently to vibrate the diaphragm, the word 'hat' is produced."

"But we cannot always recognize even a familiar voice over the telephone," objected the Doctor.

"The law of vibration I have referred to is as absolute as the fixed stars of the universe. Any variation you notice is due to a fault with the voice or means of transmitting it. We will not go into that. Do you get the idea, boys?"

"A hat is a hat. Split him three ways and he comes out h-a-t already," said Germany.

"Now as to whether it is essential for us to know all this to run this exchange: What do you think, Germany?"

"I know about him now, but maybe not tomorrow."

"It's some satisfaction to know things like that," said Frank, "but I don't know that I can use it much."

"I think I agree with Frank. I can see but one remote chance of using such information. If there is a noise on a line and we cannot recognize some word formations, we can

be pretty sure it is not due to cross talk but to some other cause. I hope we will not drift into quite such intricate questions in the future. It has tired me so I guess I'll go out with the boys and leave the work 'til tomorrow," said Mr. Barrows, preparing to leave.

(To be continued.)

Anti-Trust Legislation Being Considered at Washington.

Representative Clayton, of Alabama, chairman of the House judiciary committee, which is considering the administration anti-trust measures, has made public several letters from Chicago and elsewhere, making suggestions and pointing out defects in the bills.

P. C. Burns, president of the Electrical Merchants and Manufacturers' Association of Chicago, protested against the action of the Bell company in manufacturing and selling in direct competition with electrical dealers.

Garrison Babcock, manager of the Telephone Improvement Co., of Chicago, presented a protest of the stockholders against alleged unfair practices of the telephone monopoly. Ernest Freund, of Chicago, wrote a discussion of the effect of the proposed trust law on the common law.

S. F. Miller, of Chicago, suggested that an amendment be inserted in the bill to prevent corporations from gathering proxies to defeat the rights of the minority stockholders.

Professor Charles McCarty, of the University of Wisconsin, urged that the proposed bills be changed so as not to injure farmers co-operative associations.

The letter of the Chicago Electrical Association said:

"We wish respectfully to call your attention to a condition in restraint of trade caused by telephone operating companies using their shops, warehouses, exchange managers and other employes for the sale of merchandise throughout the United States in direct competition with merchants and manufacturers not having any special privileges or franchises from the government, thereby destroying legitimate competition.

"We respectfully request that you use your best efforts to have incorporated in the bills before Congress a provision which will stop this immoral practice.

"The American Telephone & Telegraph Co. has workshops and warehouses, known as the Western Electric Co., in all the principal cities of the country. Such warehouses and shops, together with the telephone exchange managers and other employes throughout the United States, are engaged in the sale of merchandise. They have free access to the telephone lines—a dangerous situation—the privacy sometimes necessary in the conduct of competitive business may be destroyed."

The Senate subcommittee on Inter-State Commerce appointed by Chairman Newlands to consider the anti-trust legislative programme, struggled for hours with a proposal for a tentative bill to prohibit interlocking directorates. Some regulation of this kind supplementary to the Sherman law was agreed necessary, but diverging opinions as to how rigid it should be developed among committeemen.

The tentative bill on interlocking directorates, drafted after the delivery of President Wilson's message on trust legislation, is too extreme in the opinion of some committee members, who fear it would prohibit men in business from engaging in dual legitimate undertakings advantageous to the general welfare.

The committee purposes, it was declared, to draft a bill which will not handicap or injure business, but aid it by making illegal only such forms of interlocking directorates as are deliberately formed to foster monopoly or destroy competition. The "holding company" bill, as approved at a White House conference for incorporation in the administration trust legislation program, has also been made public.

Designed "to prohibit unlawful restraint of trade or monopolies in interstate or foreign commerce by corporations through the device of intercorporate stockholding," the bill was drafted by Representatives Clayton, Carlin, and Floyd after many conferences.

It probably will be consolidated with other proposed measures, in order that the trust legislation eventually may be taken up for passage in the form of one bill. The senate interstate commerce committee, which is working to report a general anti-trust bill, has been supplied with a draft of this measure for its guidance.

The "holding company" bill would provide:

"That it shall be unlawful for one corporation engaged in interstate or foreign commerce, to acquire, directly or indirectly, the whole, or any part, of the stock or other share of capital of another corporation engaged also in interstate or foreign commerce, where the effect of such acquisition is to eliminate or lessen competition."

It would further provide, however, that "this act shall not apply to corporations purchasing such stock solely for investment, and not using the same, by voting or otherwise, to bring about, or in attempting to bring about, the lessening of competition."

Violations of the act would constitute misdemeanors punishable by a fine not exceeding $5,000 or imprisonment not exceeding one year, or both, and the measure sets forth that "any individual who, as officer or director of a corporation or otherwise, orders, takes action, or participates in carrying out any transaction herein forbidden shall be held and deemed guilty of a misdemeanor under this section."

"Nothing contained in this act," the bill continues, "shall prevent a corporation engaged in interstate or foreign commerce from causing the formation of subsidiary corporations for the actual carrying on of their immediate lawful business, or the natural and legitimate branches thereof, or from owning and holding all or a part of the stock of such subsidiary corporations, when the effect of such formation is not to eliminate or lessen a pre-existing competition."

Chicago Jovians Hear Telephone Lecture.

Members of the Chicago Jovian League at their regular weekly luncheon, at Hotel Sherman, Chicago, on March 16, listened to a most interesting lecture on, "The Human Element in the Telephone Business." The lecture, illustrated with stereoptican views, was delivered by H. N. Foster, traffic superintendent of the Chicago Telephone Co. Mr. Foster told what the company was doing to make the work of operators in handling the telephone business of a large city better by devoting attention to the surroundings and working conditions. The gardens, entertainments, lunches, rest and play rooms and equipment were described.

Mr. Foster told of the provision of dry clothing at the exchanges so that on rainy days, operators would not be compelled to risk catching cold by wearing clothing which had become wet in the trip from their homes. He also described the sanitarium the company has provided at Naperville, Ill., to which operators afflicted with tuberculosis are sent. The employment of visiting nurses to aid in caring for operators when ill and many of the plans of the company looking to physical and mental well being of its employes were touched upon during the course of Mr. Foster's lecture.

To show that these methods were productive of results in better service and loyalty Mr. Foster cited many cases which had come under his observation.

Rebates for Service Interruptions by Storm.

Subscribers of the New York Telephone Co. are being advised that allowances will be granted them for interruption to the service caused by the damage in the recent storm. More than 7,000 of these communications have been sent out by the company, requesting indulgence while repairs now under way are completed.

The Study of Inductive Interference in California

Second Progress Report of the Joint Committee on Inductive Interference Authorized by the California State Railroad Commission—Tests Made on Two Parallels of 20 and 8 Miles Between Toll Lead and Three Phase, 57,000-Volt Power Line

Since the progress report last September, the Joint Committee on Inductive Interference, authorized by the California State Railroad Commission, has given a great deal of consideration to the analysis of results obtained from the several parallels on which an investigation has been conducted, together with the preparation of a program of work to be carried out by the committee in the immediate future.

The parallels concerned in this study are described in the last progress report from the committee (TELEPHONY, October 18, 1913). The principal exposures are, briefly, two parallels (20 miles and 8 miles), between the 57,000-volt, 3-phase line of the Sierra & San Francisco Power Co. and the main coast line toll lead of the Pacific Telephone & Telegraph Co., between San Francisco and Los Angeles. In addition to the telephone lead, circuits of the Western Union Telegraph Co. are paralleled by this line in portions of its length. The high tension line in question is supplied by autotransformers at the Guadalupe substation and supplies 33,000-volt and 22,000-volt lines of the Coast Valleys Gas & Electric Co. through autotransformers at Salinas. South of Salinas, the above mentioned telephone lead is paralleled by the 33,000-volt line of the Coast Valleys Gas & Electric Co. for a distance of 41 miles between Salinas and King City. The telegraph circuits of the Western Union Telegraph Co. are also exposed to this high tension line. In all cases, the power and telephone lines are on opposite sides of a public highway. The Sierra & San Francisco Power Co. operates with a grounded neutral. Tests were made under conditions of grounded and non-grounded neutral of the star-connected autotransformers at Salinas. There are no grounds beyond Salinas on the 33,000-volt and 22,000-volt lines supplied by these transformers.

The mass of experimental data and the studies concerning these exposures are embodied in some 30 technical reports. Some of the general results and conclusions indicated by a study of these reports are as follows:

NOISE AND HARMONIC FREQUENCIES.

The fundamental, 60-cycle wave of voltage or current is relatively of little importance in the production of noise in telephone circuits. It becomes of importance, however, if it gives rise to longitudinal voltages of sufficient magnitude to constitute a physical hazard, to interfere with the operation of grounded signaling devices or superimposed telegraph service, or to operate protective apparatus on the circuits. The harmonics of the voltage and current waves are of chief interest as the cause of noise in telephone circuits, particularly the higher harmonics or those within the range of the voice frequencies. The fundamental and lower harmonics are important as disturbing factors in telegraph circuits.

The above facts show clearly the great desirability, from the standpoint of inductive interference, of having wave forms of voltages and current in power circuits free from all harmonics. That such does not obtain in the present state of the art is a basic cause of the disturbance to communication circuits paralleled by power circuits. Further than this, these facts emphasize the desirability that designers and manufacturers eliminate, as far as is practicable, those features of design favorable to distorted wave forms.

In order to facilitate the analysis of the inductive effects of a power circuit on parallel communication circuits, the voltages and currents of a 3-phase power system can be conveniently regarded as made up of components which exhibit distinct characteristics and treated separately. In any 3-phase system in which the three voltages between pairs of wires are equal in magnitude, the voltage between any wire and ground can be considered to be the vector sum of two voltages which are called the balanced and the residual components respectively. The balanced components consist of three equal voltages between the three wires and ground, the vector sum of which is zero. The residual components consist of three equal voltages between wires and ground which are in phase with each other. The residual voltage of the system is defined as the vector sum of the voltages of the three conductors to ground. It is, therefore, three times the residual voltage of the individual conductors or three times the equivalent single phase voltage of the three conductors in parallel with respect to the earth.

The currents flowing in the three wires of a 3-phase circuit may be considered to be composed of three sets of currents, namely: (1) Balanced components consisting of equal currents in each of the three line wires whose vector sum is zero; (2) a single phase current flowing in a loop composed of two of the wires; (3) a residual current divided equally between the three wires and returning through the earth. Residual current is defined as the vector sum of the three line curents. It is, therefore, the equivalent single phase current flowing through the three line conductors in parallel with the earth completing the circuit. Connections of current and potential transformers are arranged for measuring the residual current and residual voltage of power circuits under investigation.

LONGITUDINAL AND TRANSVERSE INDUCTION PHENOMENA.

For the purpose of clearness, it is convenient to classify induction phenomena as longitudinal or transverse, referring to their manifestation on a metallic circuit. Longitudinal induced voltage refers to the voltage induced between the circuit and ground in the case of electrostatic induction, and along the circuit between the two ends of the exposure in the case of electromagetic induction. The transverse induced voltage of a circuit is the difference between the longitudinal induced voltages of the sides of the circuit. In the case of electrostatic induction, this voltage acts between the two sides of the circuit, and in the case of electromagnetic induction it acts around the metallic circuit.

It has been found, in the case of the power lines investigated, that the fundamental 5th, 7th and 11th harmonics are prominent in the balanced currents and voltages while the fundamental, 3rd and 9th harmonics are prominent in the residual currents and voltages of the power system. By a comparison of the prominent harmonics in the currents and voltages of the power system with those of the induction in the telephone circuits, it is evident that the longitudinal induction arises principally from the residual voltages and currents while the transverse induction shows principally the characteristics of the balanced voltages and currents together with some effect from the residual voltage and current.

The effect of the condition of the neutral of the autotransformers at Salinas, grounded or non-grounded in so far as the induction from these exposures is concerned, is through the residual currents and voltages of the several high tension lines connected to these transformers. A representative value of the neutral current at Salinas during the tests conducted at that point is 0.3 ampere. It is composed almost entirely of

9th harmonics, together with the fundamental and 3rd harmonics, decreasing in magnitude in the order named.

Effect of Grounding Neutral.

The length of the power circuit between Guadalupe and Salinas is approximately a quarter wave length for the 9th harmonic. This fact may have some bearing upon its large magnitude and is to be further investigated by the committee. Under existing conditions with the power system in normal operation, grounding the neutral of the autotransformers at Salinas does not greatly affect the induction in the exposures concerned. Two reasons may be given for this result:

(1) The load balance on the power system is such that a relatively small amount of load current flows through the neutral.

(2) As three high tension lines are connected together by the autotransformers at Salinas, opening the neutral connection to ground of these transformers does not completely eliminate the path for the residual current of any one of the three lines, since it may then flow to earth through the admittance to ground of the other two lines.

It is quite evident from these considerations that this case presents special conditions which make it impossible to draw general conclusions applicable to any other case. Further consideration of the effect of grounding this neutral will probably be undertaken by the committee with the idea of determining its effect under abnormal conditions.

The banks of star-connected autotransformers at Guadalupe and Salinas substations are provided with closed delta secondary windings which supply power for local consumption. For test purposes the secondary delta of the transformers at Salinas was opened. A large increase in the residual voltage and residual current with a consequent large increase in the induction in parallel telephone and telegraph circuits resulted. In all cases this increase applied particularly to the 3rd harmonic. If star-connected autotransformers are used, this test indicates, therefore, that from an induction standpoint, it is beneficial to provide such autotransformers with secondary windings connected delta.

On the eight-mile exposure it was possible to measure separately under different conditions of the telephone circuits, the electromagnetic and electrostatic induction. For this exposure, also, computations of the magnitude of the induction, both electromagnetic and electrostatic, were carried out. In computations of electromagnetic induction, experience has indicated that the distance between wires and their images cannot be assumed to be twice the height of the wires above the ground. Special tests were carried out in order to determine the equivalent of the image condensers. These tests indicated this depth to be approximately 300 meters below the earth's surface.

Due to the electrostatic shielding effect of neighboring objects it was found, also, that the computed electrostatic induction was greater than that actually observed, indicating that, in effect, the ground surface was brought nearer to the conductors. Electrostatic shielding of the circuits under test by grounding other circuits on the telephone lead at one point, reduced the electrostatic induction, particularly the longitudinal induction.

The effect of typical terminal apparatus of a telephone circuit in reducing the amount of extraneous current reaching the telephone receiver was the subject of some investigation. These efforts vary with the length of the line and character of the induction.

As a means of minimizing inductive interference, some study has been given to the proper relative transposition of power and telephone circuits. Some of the considerations involved in this study are given in the portion of this report dealing with the future work of the committee.

The field engineering staff of the committee is now at Santa Cruz and is investigating the parallel between the 22,000-volt, 3-phase line of the Coast Counties Gas & Electric Co., and a toll lead of the Pacific Telephone & Telegraph Co. This parallel is between Santa Cruz and Watsonville and is approximately 17 miles in length, the two lines occupying opposite sides of the public highway. The system of the Coast Counties Gas & Electric Co. is isolated from ground. The high tension line involved in this exposure may be taken out of service when occasion requires and used for experimental purposes.

The committee plans to conduct on this exposure a series of tests for the purpose of determining the effectiveness of several different systems of transpositions of the power and telephone circuits. In considering transposition systems for parallel power and telephone circuits, account must be taken of the effect of such transpositions on the different types of induction arising from the different components of the voltages and currents of the power system.

The longitudinal induction arising from balanced voltages and currents can be made as small as desired by the insertion of a sufficient number of properly located power circuit transpositions. The longitudinal induction arising from the residual voltage and current of the power circuit is unaffected by power circuit transpositions except in so far as the magnitude of the residual voltage and current is affected by such transpositions in a power circuit tend to equalize the capacities of the three phases to ground and, hence, reduce any residual voltage which may be due to inequalities in the capacities of the three conductors to ground.

Residual voltages and currents give the same inductive effects as a single phase, grounded circuit operating with the three power conductors in parallel. For this reason residual voltages and currents, though small in comparison with the balanced voltages and currents, have proportionally a very large effect in producing longitudinal induction in nearby circuits. The longitudinal induction arising from either the balanced or residual voltages and currents is independent of the transpositions in the telephone circuits. The large inductive effects resulting from a relatively small residual voltage or current and the inability to reduce the longitudinal induction arising therefrom, render highly desirable the elimination from the power system of such residual components of voltage and current.

The transverse induction from residual currents and voltages can be reduced by transpositions in the telephone circuits which tend to equalize the induction into the two sides of the circuit by exposing each side equally to the effect of the power circuit. The transverse induction from balanced currents and voltages is affected by transpositions in both the power and telephone circuits.

The problem of designing transpositions to minimize the inductive interference between parallel power and telephone circuits is further complicated by the elaborate transposition system of the telephone circuits, which is designed to reduce the induction or cross talk between different telephone circuits. In order to be most effective in reducing inductive interference, it is absolutely essential that the transpositions in the power and telephone circuits be located with due regard to each other.

Study of Transpositions.

By the experimental study of transposition systems being conducted at Santa Cruz, the committee hopes to be able to determine:

(a) The effect of power transpositions in reducing the longitudinal induction arising from balanced currents and voltages.

(b) The effect of telephone transpositions in reducing the transverse induction arising from: (1) residual currents and voltages; (2) balanced currents and voltages.

(c) The effect of power and telephone transpositions, pro-

perly located with respect to each other, in reducing both the longitudinal and transverse induction arising from balanced currents and voltages.

(d) The relative effectiveness of different transposition systems in reducing electrostatics and electromagnetic induction.

In its application to other exposures, the information to be obtained from this experimental study will be chiefly of value in indicating the limits and refinements within which it is necessary to work and the accuracy with which the effectiveness of any proposed system of transpositions may be predetermined.

In addition to the study of the effect of transpositions, the committee will undertake in the near future to determine the effect of known amounts of noise (extraneous current), in the telephone receiver in reducing the intelligibility of conversation over a circuit. As the first step in this investigation, tests will be conducted to determine the detrimental effect of known amounts of single frequency extraneous current in reducing the intelligibility of conversation. This detrimental effect will be rated as the equivalent of an increase in the length of the circuit. From such tests with single frequency extraneous currents the relative detrimental effect of currents of different frequencies will be obtained. This, together with information as to the detrimental effect of currents of complex wave form, will give information by which the law of the combination of the single frequency effects can be obtained.

Until such time as the committee is prepared to make recommendations to the railroad commission, it feels at liberty to indicate only in the most general way the results of its investigation. Since its formation, a year ago, the work of the committee has served to emphasize to all members the magnitude of the problem under investigation and the necessity of a thorough consideration of the subject in all its different phases, before the committee, in justice to itself and to the Railroad Commission of California, can make final recommendation to that body for its action.

Mitchell, S. D., Can Lawfully Build Telephone Plant.

Judge Robert B. Tripp, of Yankton, S. D., recently dismissed the suit for injunction brought to restrain the city of Mitchell, S. D., from building the $60,000 telephone plant voted at a special election last June.

This is the first ruling on the legislative act of 1907 permitting cities to engage in the telephone business. Judge Tripp also held that a majority of the votes cast at the special election was sufficient to carry the vote on the bonds.

The case will be carried to the supreme court. The decision is the latest development of a three-year fight between the city and the Dakota Central Telephone Co.

Dilemma in Indianapolis As to New Construction.

William Fortune, president of the Indianapolis Telephone Co., has replied to the Indiana Public Service Commission, that he will hold up further construction work provided his company can do so without violation of its franchise requiring that certain things in the way of service shall be given to subscribers.

When the Central Union Telephone Co. filed a petition with the commission for measured rates, another petition was filed by Willis Thompson et al., asking that work being done by the two Indianapolis companies be stopped, as in event of unification of the two plants, such work would be a useless and expensive duplication for which the citizens of Indianapolis would have to pay.

Following this petition the commission wrote the companies asking that work be halted. Mr. Fortune's reply is that he will acquiesce, if the law will permit. The commission's reply is that Mr. Fortune may do as he likes, but the commission will not permit capitalization of the new work when the companies merge.

Government May Buy Leavenworth System.

Representatives of the government are engaged in taking an invoice of the stock and equipment of the Home Telephone Co., of Leavenworth, Kan., and it is proposed that the government buy this plant for use at the largest military fort in the country. A telephone plant is badly needed at the fort, and inasmuch as this plant will meet with the necessary requirements, it has been deemed advisable to buy this plant instead of building a new one. The Home Telephone Company and the Bell company plants of the city of Leavenworth were recently consolidated and there is but one company operating in the city now.

Telephone Company's Rose Carnival Float at Tampa, Fla.

W. G. Brorein, president and general manager of the Peninsular Telephone Co., of Tampa, Fla., has favored TELEPHONY with a photograph, reproduced in the accompanying

Peninsular Company's Float in Parade at Tampa, Fla.

illustration, showing the company's float in the gasparilla parade during the Gasparilla Carnival held in Tampa from February 21st to 24th inclusive.

Telephones in Italy.

Under an act of the Italian Parliament of July 15, 1907, writes Consul Nathaniel B. Stewart, of Milan, the telephone service in the larger cities of the kingdom was taken over by the government through the purchase of the plants of the largest two operating companies. Several smaller companies were allowed to continue operations for 10 years before being taken over by the government and in 1913 the term was extended in some instances for 10 years longer.

The government operates the principal long distance lines and has exchanges in 69 cities. On June 30, 1911, the number of government subscribers was 51,828 and of subscribers to private lines 24,233. The number of government subscribers in the principal cities on June 30, 1911, was as follows: Milan, 11,207; Rome, 10,025; Genoa, 5,783; Turin, 5,050; Naples, 3,671; Florence, 3,347; Venice, 2,045; Bologna, 1,628; Palermo, 1,293. There are 10 principal concessionaire companies.

The exchange equipment of the Milan central office is of two kinds, the common battery multiple switchboard of vertical type, and the magneto multiple board of horizontal type. The former was manufactured by an American, and the latter by a German company.

Annual Reports and Meetings of Telephone Companies

Statements Given Out by Telephone Companies in Various Parts of the Country Relative to Their Operations During the Past Year—Summaries of Earnings and Expenses—Growth in Number of Subscribers and Equipment—Provisions for Future Development

Earnings of Canadian Bell Company.

The annual report of the Bell Telephone Co. of Canada, for the year 1913, shows an increase of 16 per cent. in gross earnings and an increase of 17 per cent. in net earnings over 1912.

The following table summarizes the earning statement for the past two years:

	1913	1912
Gross earnings	$8,850,448	$7,638,304
Less operating expense	3,214,564	2,647,862
Maintenance	1,549,978	1,403,339
Depreciation	1,680,000	1,535,000
Taxes	190,648	171,917
Total deductions	6,635,191	5,758,118
Net earnings	2,215,257	1,880,185
Bond interest	421,735	282,091
Balance	1,793,522	1,598,095
Dividend	1,289,790	1,148,960
Surplus	503,732	449,113

New financing in 1913, which increased the bond issue by $4,500,000 to $11,149,000, and the stock issue by $3,000,000 to $18,000,000, added considerably to interest charges which were $139,644 higher, and to dividend payments which were $14,630 higher. After all deductions, however, there was a surplus balance of $503,732 out of the year's earnings, against $449,133 the previous year. As usual, before bringing down the net earnings, liberal allowances had been made for maintenance and depreciation, the amounts set aside under these two heads totaling $3,229,978, or $291,639 more than in 1913.

As a result of the new stock issue during the year, the balance available for dividends, while $195,427 higher than in 1912, bore almost exactly the same ratio to average paid-up capital as the previous year. Earnings on the stock in 1912 were at the rate of 11.127 per cent.; last year they were at the rate of 11.124 per cent. A statistical statement appended to the report, shows that the company's earnings on total investment, including surplus earnings, put back into business, were 6.2 per cent., against 7.6 per cent. in 1910, the last year for which such figures are available. The total investment of the company is now placed at $35,572,902, an increase of about $13,000,000 in the three years.

Annual Report of the Fulda Telephone Co.

The Fulda Telephone Co., of Fulda, Minn., is a system having eight exchanges, with 621 exchange telephones and 1,406 rural telephones. The average monthly rental figures out to $1.07 per telephone. The report of the company for the year ended December 31, 1913, shows the earnings (collected) to have been $30,393, which, less decrease in book account of $3,000 and operating expenses of $13,034, left net earnings of $14,358. Disposition was made of net earnings as follows: Allowance for depreciation of 7 per cent. on 1913 valuation, $4,358; 10 per cent. for 1914 dividends, $7,500, and transferred to surplus account, $2,500.

The statement of sundry receipts shows a nominal sum of cash on hand at the beginning of the year, money realized from the sale of stock $11,200, from bills payable issued $3,500 and from bills receivable $8,100, a total of $23,176. Of the earnings collected, $26,604 was for telephone rent, $2,787 for toll commissions and connections and $400 for directory advertisements. The sundry disbursements included bills payable paid $3,500, money loaned $8,100, 1913 dividends paid $6,500, sum transferred to construction account $13,869.

The company's inventory and statement of liabilities as of December 31, 1913, was as follows:

INVENTORY DECEMBER 31, 1913.

2,207 telephones at $33.55	$68,049
115 miles iron toll lines	5,000
50 miles iron toll lines	500
22 miles copper toll lines	1,500
Material on hand	348
Book accounts	1,000
Cash in bank	7,703
Horses, wagons, tools and fixtures	900
Total	$85,000

LIABILITIES.

Capital stock issued	$75,000
Reserved for 1914 dividend	7,500
Surplus	2,500
Bills payable, none.	
Accounts payable, none.	
Total	$85,000

At the annual meeting of the company, held on March 2, the following officers were re-elected to serve for the coming year; C. H. Helweg, president; M. J. Dickson, vice-president; J. J. Schueller, treasurer; F. D. Lindquist, secretary and manager. All of these officials are residents of Fulda and together with the following named persons constitute the board of directors: J. F. Liepold, of Heron Lake; C. W. Becker, of Wilmont; and J. B. Ludlow, of Rushmore.

Report of Coon Valley (Wis.) Farmers Telephone Co.

The annual report of the Coon Valley Farmers' Telephone Co., of Coon Valley, Wis., for the year ending December 30, 1913, shows operating revenues of $6,933, made up of exchange revenues $6,172, and earnings from connecting line, $761. The operating expenses totaled $4,968, made up as follows: Central office $1,654; wire plant, $343; substation, $672; commercial, $50; general, $476; undistributed, $195; depreciation, $1,403; taxes, $173. The net operating income was $1,966. The net income was $1,174, providing dividends of $1,283, and a surplus for the year of $491. The total surplus on December 31, 1913, was $1,323.

The balance sheet shows the total assets of the company to be $23,781 as compared with $21,017 a year ago. Capital assets are $23,211. The company has capital stock of $13,320 and a depreciation reserve of $4,628. The number of telephones on December 31, 1913, was 525, a gain of 26 during the year.

The officers and directors of the Coon Valley Farmers' Telephone Co., are as follows: President, A. C. Brye; vice-president, A. O. Wangen; secretary and treasurer, Albert Spellum. The directors are: A. C. Brye, A. O. Wangen, Carl Gullord, K. T. Lindvig, J. E. Lepke and O. M. Galstad.

Sanitary Drinking Facilities for Bell Employes.

The Bell companies have arranged to install drinking cabinets with sanitary paper cups for the use of employes in exchanges in Pennsylvania, Ohio and West Virginia.

Practical Subjects—Letters and Discussions

New Plans for Raising Funds for Extensions.

The provision of funds for additional equipment and extensions is a problem which frequently confronts the officials of telephone companies. The plan for raising such funds adopted by the directors of the Rochester Telephone Co., of Rochester, N. Y., is interesting. It provides for the issuing of bonds to general mortgage bondholders

1914

ROCHESTER TELEPHONE COMPANY:

I am the owner of $_____ par value of the General Mortgage Bonds of the Rochester Telephone Company and in compliance with your request of March 5th, I hereby agree to clip from such bonds and surrender to you all interest coupons for two years, beginning with the coupons becoming due in April next, in exchange for new General Mortgage Bonds in amount equal to the par value of the coupons so surrendered, provided that not less than ninety per cent of the holdings of such bonds agree to such exchange.

_____

_____

Form of Agreement Sent to Bondholders.

in exchange for the interest coupons for the next two years on bonds already held.

The full details of the plan are given in a letter to the bondholders. The letter was issued under date of March 5, and was accompanied by a statement giving comparative financial figures of the company for the past two years. A card containing an acceptance of the plan was also included with the letter. The letter is as follows:

"To the general mortgage bondholders of the Rochester Telephone Co.:

It has long been apparent to the officers and directors of your company, that if its operations are to be successfully continued, considerable additions must be made, from time to time, to its capital investment. A time has now arrived when such an addition must be made. If it is not made, serious trouble, if not disaster, is likely to follow. The company is a public service corporation and under the law is bound to furnish service to all who demand it. As the city grows, the telephone system must also grow, and additional capital must be provided from time to time to enable it to do so. The earnings of a public service corporation can never, under such rates as they are by governmental regulation permitted to charge, be sufficient to provide for all capital additions that may be required.

In the year 1908, out of the then proposed re-organization of the United States Independent Telephone Co., your company received $200,000 of new capital, for which it issued its general mortgage bonds at their par value. That sum was sufficient for the then urgent needs of the company. Since then, there has been no addition to the capital investment except from the excess of earnings, over operating expenses, interest and depreciation charges. The company has, for the last few years, been making fairly good progress. During the last year, its net earnings, above its operating expenses, interest, and a moderate depreciation charge, amounted to about $50,000. It undoubtedly would have made more rapid progress and would have shown a larger net income had it had capital to provide itself with facilities for meeting the constantly growing demand for its service. Every economy has been practiced and every effort has been made to keep the service up to the highest possible state of efficiency and to meet all demands for its service. It has nevertheless been unable to comply with such demands and is falling more and more into arrears in that respect. It is consequently imperative that extensive additional equipment be provided, without delay. At least $200,000 must be raised to provide such additional equipment within the next two years. The surplus net earnings will doubtless be sufficient to produce one-half of that sum, or $100,000. Some method must be devised of raising the remaining $100,000.

While, as we have said, the company has been making progress for some years, nevertheless that progress has not been sufficient to make its securities, either stock or bonds, attractive to new investors. The company must therefore look to those who hold its outstanding securities to provide the sum mentioned. You, the general mortgage bondholders, are most deeply concerned and to you, therefore, this communication is addressed. After careful consideration, the most feasible method of raising the additional $100,000, that we have been able to discover, is to ask you to clip from your bonds and surrender all the interest coupons for the next two years, beginning with those which become due on the first of April, next, and to take in exchange therefor new bonds with the coupons for those two years clipped therefrom. The only loss to you from this course, as you will readily perceive, will be the loss of interest upon the interest coupons which you clip and surrender, from the time of their maturity to the time when the next coupons become payable. That loss will, of course,

	1913	1912	Increase	Decrease
Gross Revenue	$465,693.52	441,022.06	24,671.46	
Operating Expense	298,993.82	273,145.58	25,848.24	
Net Operat'g Income	166,699.70	167,876.48		1,176.78
Bond Interest	53,580.00	62,565.00		8,985.00
Earnings	113,119.70	105,311.48	7,808.22	
Depreciation Reserves	54,452.00	50,880.00	3,572.00	
Net Earnings	58,667.70	54,431.48	4,236.22	

ASSETS.

Fixed Capital 1-1-12	$1,758,032.35
Added since 1-1-12	200,842.21
Sec'rts other Co's.	61,780.00
Cash	19,814.57
Bills Receivable	46,450.00
Accounts Receivable	52,560.54
Interest Receivable	5,392.85
Material and Supplies	38,101.19
Trustee Funds	7,048.96
Reacquired Bonds	179,800.00
Prepayments	5,871.60
	$2,375,694.27

LIABILITIES.

Stock Outstanding	$ 489,400.00
Funded Debt	1,251,300.00
Bills Payable	55,000.00
Accounts Payable	48,203.72
Taxes Accrued	2,076.00
Interest Accrued	12,168.75
Advance Service	1,598.76
Reserve Depreciation	288,881.98
Other Reserves	35,207.95
Surplus Invested in plant since 1911	189,380.75
Surplus Unappropriated	2,476.36
	$2,375,694.27

Financial Statement of the Company's Operations.

be trifling. It will, besides, be more than made up to you by the increase in the value of the property covered by the mortgage by which your bonds are secured. The amount of outstanding general mortgage bonds is about $1,000,000. Interest on that sum for two years at five per cent. is $100,000. That $100,000 will go into the plant and at the same time there will also go into the plant the surplus net earnings of at least an equivalent amount. Thus at the end of two years you will have lost a trifling amount of interest upon interest, and will have gained a net addition to the value of the property by which your bonds are secured of the $100,000 which will come from the surplus net earnings of the company.

We submit this solution of the question to you without any reluctance, because in our judgment it will, if adopted, inure to your decided benefit. We, therefore, without hesitation, earnestly recommend its acceptance and that you signify your acceptance by signing and returning the enclosed card, at your earliest convenience. This plan, of course, cannot be effectual unless it is accepted by you very generally. We think we should say to you that we shall not endeavor to make it effectual unless those of you holding at least 90 per cent. of all the outstanding bonds signify your acceptance in the manner suggested. If acceptances to that amount are not received on or before March 25th, we shall assume that they will not be forthcoming.

It is obviously highly desirable that the company shall, if possible, avoid a default in the payment of interest upon its bonds. It is, however, so essential that the efficiency of the system be maintained and that its growth keep pace with the increase of the demand for its service, that it will be better and wiser to let the interest default occur rather than to allow the efficiency to be impaired or the growth to be stopped. That, at any rate, is the settled judgment of the officers and directors of your company. The possible consequences of an interest default are well known and require no explanation.

All of which is respectfully submitted.

By order of the board of directors,
George R. Fuller,
President.

P. S. Immediately after March 25th next, if the requisite number of bond holdings have consented to exchange the two years' coupons for new bonds, you will be requested to clip yours and send them to us, for which you will receive the bonds in due time."

System for Indicating Line Rings.

Several items regarding the numbering of telephones have been published, but I have never seen the system we are using, which was worked out by the writer before becoming a subscriber to TELEPHONY, and, in fact, before having an opportunity of acquainting himself with methods used by others. It does the work nicely on an exchange with less than 100 lines operating open ringers. Our method is as follows:

Jack No. 47 being a farmers' line with 15 telephones. All numbers have the long ones ring first and the short ones next. Then we let the units and tens column represent the jack number, the hundreds column the short rings, and the thousands column the long rings. For example the telephone, whose ring is one long and one short, is numbered 1147 or 11-47 and the one whose ring is four short is numbered 447 or 4-47. In the case of two long rings, the numbering is 2047 or 20-47, etc. The number can be used as first listed when subscribers are required to call numbers by digits 1-1-4-7, which is the way we use it, or as the latter, when numbers can be called "Eleven forty seven."

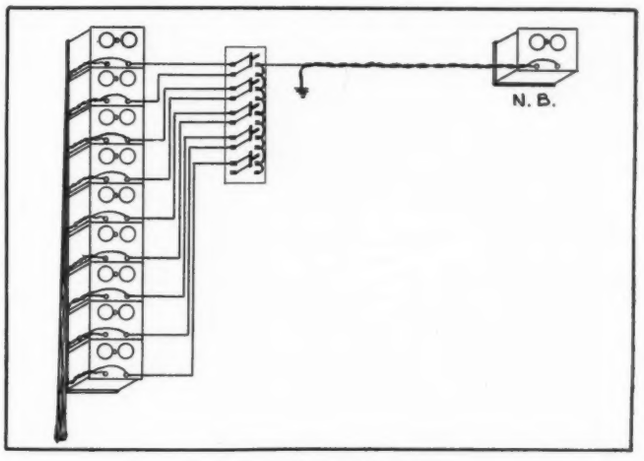
We employ this system of numbering throughout our exchange as we use open ringers only. On the town lines, which have only one telephone, we place number 1, before whatever jack number the line is on and the operators understand that one short ring is sufficient.

Jesse C. Ellis, Secy.-Treas.,
Clayton, N. C. Clayton Telephone Co.

Providing a Night Bell.

At a small station with extension bells, a night bell was wanted. It was not desired to buy new or expensive equipment, but as there were plenty of extension bells and switches, this is how it was arranged.

A tap was taken from one binding post of each bell and



Arrangement for Night Bell.

run to one pole in the row of switches and all of the poles on the other side of the row of switches were looped together, connected to one wire of a twisted pair and run to the night bell. The other wire was grounded. To "put on" the bell, the row of switches was closed, and as the telephones on the lines were all equipped with push buttons, it worked slick.

A READER.

Letters in Designating Party Lines.

In regard to the article, "To Elimiate Letters in Designating Party Lines," in TELEPHONY, issue of March 7, page 28, have the New York Telephone Co.'s experts just awakened to the fact that letters and numbers make a very poor combination by which to designate a subscriber? This combination puts the burden of the call upon the operator to cipher out the nationality of the caller, in order to get the straight of the call.

If the New York experts will dig up the American Telephone Journal of August 2, 1902, page 69, they will find an article on this subject. As the Bell has tried all letters in the English alphabet perhaps you had better call their attention to the Chinese characters.

C. E. Nicholas, Manager,
Redondo Beach, Cal. Redondo Beach Telephone Co.

New York's Fifty-Second Mountain Telephone Observatory.

By an order issued by the Conservation Commission of New York state another mountain observation station has been established in the Adirondacks for the purpose of forest fire protection. The latest is to be located on Blue mountain in the vicinity of the towns of Hopkinton and Waverly near the line of St. Lawrence and Franklin counties. A telephone line will be put up in the spring by the forest rangers and the poles will be supplied free by the proprietor of the Blue Mountain house. This will make the 52nd mountain observatory established by the commission.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

Rate Compromise at Little Rock, Ark.

As a result of the vigorous protest of city officials and telephone users in Little Rock, Argenta and Pulaski Heights, Ark., against the proposed rate increases announced by the Southwestern Telegraph & Telephone Co. to become effective on April 1, the company has agreed to a compromise.

Heretofore the rates in Little Rock have been $4 per month for business service and $2.25 per month for residence service. The company announced that the rates for unlimited service would be increased to $5 per month for business and $2.75 per month for residence telephones. The city officials and committee of citizens proposed that the rates be $5 for business and that the residence rate of $2.25 remain as at present. In agreeing to this compromise General Manager Hiss said:

It is our opinion that our proposed graduated rate schedule would be better and fairer for the small as well as the larger user. However, the committee representing the city and subscribers have been very fair, recognizing that we are entitled to the increased revenue sought. It is their belief, out of their knowledge of the local conditions, that we shall secure the revenue asked by this schedule they suggest, and we feel that it is only right that we act on their judgment and try the experiment for one year at least. If at the end of that time we find that the rates are inadequate to pay the expenses for keeping up the service and to make a fair return on the investment, we will again come before the public as we have this time, and ask for a reasonable adjustment.

New Rate Ordinance Being Threshed Out in Denver.

A new rate ordinance, known as the Brown-Stevens ordinance, has been prepared by City Attorney Stevens of Denver, and James H. Brown, author of the Brown ordinance, which measure Judge John H. Denison, of the district court, held to be void. The new ordinance goes elaborately into the rate question, keeping as closely as possible to the Brown rates. Should the courts hold these rates confiscatory an alternative schedule is embodied based on the telephone company's own classification, but with a 30 per cent. reduction.

The city commissioners recently held a conference at which they cross questioned Page Lawrence and John B. Geijsbeek, accountants, representing the Schirmer committee, and subjected the voluminous report of these accountants to an analysis which, it is declared, disprove several of the company's contentions upon which its opposition to a decrease in rates is based.

Chicago Merger to Await Action by New Council.

Action in regard to authorizing the purchase, by the Chicago Telephone Co., of the automatic telephone system of the Illinois Telephone & Telegraph Co., has been postponed by the council committee on gas, oil and electric light, until the first week in May, after the new council is organized. Alderman Merriam's contention is that under the terms of the automatic telephone franchise unless the company has 20,000 bona fide subscribers the property reverts to the city, and he urged an investigation be made to determine the exact number of such subscribers. An attorney for the company claimed that there were 23,274 bona fide subscribers.

At a recent meeting of the committee B. E. Sunny, president of the Chicago Telephone Co. estimated that $4,000,000 would be charged to the capitalization of his company as a result of the merger. The option of the company calls for the payment of $6,300,000. On this basis $2,300,000 would be borne by the American Telephone & Telegraph Co. Asked if the Chicago Telephone Co. intended to abandon the equipment of the automatic system if is was acquired, President Sunny said that was not the present intention, but that very little was known about the property. If it could not be operated advantageously it probably would be scrapped.

Illinois Commissioners' Views on Duplication of Lines.

In rendering the decision of the Illinois Public Utilities Commission, in the recent case in which the Bethany Mutual Telephone Co., of Bethany, Ill., was refused permission to establish a line at Bethany to compete with the Macon County Telephone Co., Judge Owen P. Thompson, of the commission said:

"I see no reason for the operation of two telephone systems anywhere, even in Chicago. Two telephone systems only lead to confusion. Where a business man, or a private family has one telephone in their residence or office, they can reach only half of the public telephones. In order to get all telephone service, they have to have two telephones, pay twice for the service which should be had for half the price, under one system."

In discussing the case, members of the commission declared that under the law, telephone companies can be required to give adequate service at reasonable rates, and that the ruling does not tend to give monopolistic privileges.

"We can, and will, require all public service corporations to give the best service at reasonable rates," said former governor Yates. "There is no necessity for two such companies when one can be required to give the necessary service, at rates which the commission is empowered to regulate."

While the ruling applies only to new companies, which contemplate entering the fields in which one company is already in operation, the decision is expected to have a marked effect on companies already operating within the state.

The public utilities commission, under the law creating it, may require telephone companies to interchange service, and such a ruling is expected by those who are in a position to know what may be a move by the commission within a short time. It is understood that the Bell system is ready to meet this demand.

Some hope was held out to the representatives of the Bethany organization in that if they desired to operate solely and simply a co-operative company, with each subscriber paying his pro-rata portion for the expenses of the company, that then a certificate would be granted on these grounds, to furnish service. The understanding, however, is that this service must be only to those persons or firms who pay their pro-rata portion of expenses.

It is said to be likely that the new organization will take advantage of this proposition, thus operating solely as a mutual company.

Indiana Farmers Fight Advance Payment.

Monticello, Ind., is practically without telephone service because of the difficulty which has arisen from the efforts of the Monticello Telephone Co., to collect from farmers for three months in advance. Doctors are advertising that

they can be reached by messenger or postcard, and the situation is that of a town before the advent of speech carrying apparatus. The immediate result of the farmers' refusal to meet the new order was the cutting off of about 100 telephones, and the city merchants and professional men took sides with their rural patrons. Meantime a committee of citizens has called a meeting for the purpose of organizing a new company and has made some progress. The matter is to be referred to the Indiana Public Service Commission for settlement.

Agitation for Lower Rates in Topeka.

Petitions are being circulated among subscribers of the Missouri & Kansas Telephone Co., in Topeka, Kan., and are being freely signed requesting a reduction in telephone rates. The petitions will be presented to the Kansas Public Utilities Commission. Individual line rates in Topeka are $3 a month for business and $2.50 a month for residence telephones. Four-party line rates are $1.85 and six-party line residence rates $1.50. The six-party line rates apply to the rural districts and to Oakland, a suburban town.

New York Mileage Rates on Multi-Party Lines.

At a recent hearing at Syracuse, in regard to rates charged by the New York Telephone Co., C. H. Bennett and other subscribers, at Camillus, Commissioner Decker, of the New York Public Service Commission, declared himself opposed to the practice of charging each subscriber on a multi-party telephone the full mileage rate for talking to Syracuse.

Testimony showed that formerly the 18 subscribers on a line in the Solvay zone enjoyed direct service to Syracuse at $24 a year. This was later increased to $30. The subscribers were subsequently deprived of direct service and were offered service through the Solvay switchboard at $18 a year with toll charge to Syracuse. Desk telephones were removed and the old style magneto instruments installed.

At the hearing George R. Grant of the New York Telephone Co. said that the subscribers in the Solvay zone could have direct service to Syracuse at $30, plus a mileage rate of $8 a mile. Here Commissioner Decker broke in and desired to know if each of the subscribers would have to pay the whole rate or if it would be divided among them. Mr. Grant informed him that it was the practice of the company to charge the full mileage rate.

"You go ahead and do that in this case," said Mr. Decker, "and we will hold another hearing, but let me tell you it will be a short one. I am opposed to this piling up of mileage rates on multi-party lines. I think you are, too, and your company. In other parts of the state you have this service at a rate of from $12 to $24 without a mileage rate and it could be done here as well."

"That will open up a state-wide discussion," replied Mr. Grant.

"I am ready to meet you on this question in any part of New York State," returned Mr. Decker, "I hope it does come up."

New York Commission Has New Chairman.

Governor Glynn, of New York, who recently appointed Seymour Van Santvoord, of Troy, a member of the Public Service Commission of New York, Second District, has now appointed Mr. Santvoord chairman of the commission, succeeding Chairman Martin S. Decker. Mr. Decker will continue as a member of the commission.

Following a conference at which were present Governor Glynn, Seymour Van Santvoord and Senator Foley, chairman of the telephone investigating committee of the legislature, Governor Glynn has sent in to the legislature a special message requesting an appropriation of $100,000 to be used to defray the expenses of the appraisal of the New York Telephone Co. Bills to carry out Governor Glynn's recommendation have been introduced into the senate and assembly.

Michigan Companies to Confer With Commission.

The Michigan Railroad Commission has invited all telephone companies in the state to attend a general conference with the commission at Lansing, on March 25, with a view of getting better acquainted and having a better understanding of the laws regulating telephone companies.

There are 326 incorporated telephone companies in the state and 956 not incorporated, a total of 1,277. Many of the unincorporated companies are rural lines. All telephone companies in the state are required to make a report to the commission. More than 450 telephone companies have not even answered the letters sent out by the commission recently.

Many of the informal complaints come from subscribers of the smaller companies and the commission feels that more harmony can prevail and a better understanding be arrived at between the commission and companies if an organization among the telephone companies can be perfected.

In order to establish certain standards of construction and service, it is necessary that the telephone companies have a better understanding of the laws. The commission wants the views of the telephone companies as to what standard of construction and service should be arrived at from a representative organization.

The commission desires that all companies in the state, whether connected with the Bell interests or Independent, be at the conference.

Omission of Title in Directory Causes Complaint.

Because the title "Dr." was omitted from before his name in the telephone directory of the Citizens' Telephone Co., Dr. Frank D. Craggs, who has been practicing at Cadillac, Mich., for 14 years, has made complaint to the Michigan Railroad Commission, through an attorney, alleging the telephone company is guilty of unjust discrimination in giving preference and advantage to other members of the profession in his city. He also alleges the telephone company demands from him a rate for a residence telephone that is excessive compared with the rate charged others for the same privilege.

He asks that the company be required to issue new directories with the name "Dr. Frank D. Craggs" where the name "Frank D. Craggs" now appears and that one of these directories be placed with every one of the company's subscribers in the district. If the telephone company will have the name of "Dr. Frank D. Craggs" printed on slips and have these pasted over the other name in the directories already issued he will be satisfied.

Cleveland Improvements Hinge on Rate Understanding.

In commenting upon contemplated improvements to be made within two years at an expense of $500,000 an official of the Cuyahoga Telephone Co., of Cleveland, states that when full plans have been prepared from the reports of its engineers the entire data will be placed before the Ohio Public Utilities Commission.

"If the commission assures us then," said the official, "that we will be allowed to charge a rate to subscribers that will warrant the expenditure for improvements, then the work will go ahead. This, however, does not mean that subscribers will be forced to pay a higher rate than at present. It means that we want some understanding that rates will not be reduced by some action on the part of the commission subsequent to any procedure on the improvement."

Wisconsin Mutual Company Need Not Pay License Fees.

Wisconsin telephone companies that are purely mutual and which, instead of receiving tolls or rentals from the persons using the service, confine the service to the members of the association, are not compelled to pay license fees to the Wisconsin state treasury. The point was raised by State Treasurer Henry Johnson with reference to the Farmers' Badger Telephone Co., and Attorney General Walter C. Owen gave this ruling.

"It does not appear anywhere from their report that this company renders any telephone service for compensation," says the opinion. "I do not believe that the receipt of $20 for rentals of lines and $2 for rental of poles constitutes rendering telephone service for compensation within the meaning of the statute."

Wisconsin Company's Extension Made Without Authority.

That the Lisbon Telephone Co. in Waukesha county, Wisconsin, violated chapter 610 of the laws of 1913 when it extended its lines into the town of Lisbon without first notifying the Wisconsin Railroad Commission and the Pewaukee-Sussex Telephone Co., is held by the commission in a recent decision. The finding is based upon an investigation made by the commission upon its own initiative when its attention was called to the fact that the Lisbon company had made an extension without meeting the legal requirements. The commission says, however, that it has no authority to make an order to discontinue the line and can only say that public convenience and necessity do not require it. This opens up the matter for prosecution if anybody desires to go that far.

Appraisal of Property at Watertown, S. D.

An appraisal of the property of the Dakota Central Telephone Co., in Watertown, S. D., has recently been in progress by a committee consisting of John Moodie, of the Watertown Commercial Club, Clyde Reed, a Watertown business man, and W. F. Sloan, consulting engineer, of Madison, Wis.

The company filed with the South Dakota Railroad Commission a proposed schedule of rates for its new plant at Watertown, but the city commission objected to the rates as being too high. The matter was left to arbitration, the company appointing Mr. Moodie and the city Mr. Reed. These gentlemen appointed Mr. Sloan as the third arbitrator. Unless the committee finds that the company will make more than eight per cent. on its investment the rates as filed with the commission will become effective.

Pennsylvania Commission Organizes Traffic Bureau.

The Pennsylvania Public Service Commission has organized a traffic bureau in charge of George P. Wilson, of Philadelphia. The commission is also adding an engineer and an accountant to its staff.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

February 28: Notification from commission to supervisors at Fresno, of the commission's willingness to grant without hearing if the supervisors have no objection, the application of the Reedley Telephone Co. to abandon its flat rate charge, of 25 cents without time limit, for toll messages, and adopt the air line basis established by the commission for the Pacific Telephone & Telegraph Co.

March 23: Postponed hearing on the matter of induction, on the complaint of the Southwestern Home Telephone Co. against the Southern Sierras Power Co.

ILLINOIS.

February 26: Arbitration decision by Frank H. Funk, of the Illinois Public Utilities Commission under which the Home Telephone Co., of Dixon, Ill., abandoned the toll rate charged its farmer patrons in Lee county beginning with January 1, 1914. One thousand farmers organized in protest and the matter was referred by agreement to Commissioner Funk. The company returns to the rates in force on July 1, 1913.

March 19: Conference held at Springfield with representatives of telephone companies for a general discussion of telephone matters and problems.

INDIANA.

March 4: Refusal to order an exchange of service between the Citizens Telephone Co. of Clay County and the Clay City Mutual Telephone Co.

March 4: Refusal to allow the Lewis Telephone Co., of Lewis, to restore long distance service to the Harrison Township Farmers Mutual and the Clay City Mutual companies.

March: Petition as to connection of service between the South Bend Home Telephone Co. and the Central Union Telephone Co. as passed unanimously by the South Bend city council.

March: The Avilla, Ind., telephone tangle has not been decided by the commission as yet. At the hearing just closed, the Central Union Telephone Co., which seeks to keep out a competing company, made a proposition to appoint one member of a board to appraise its property, one member to be named by citizens, and the Central company to sell to the Avilla Mutual Telephone Co.

KANSAS.

March 31: Hearing as to the efficiency and sufficiency of the telephone facilities and services at Ottawa, Kan., of the Kansas City Long Distance Telephone Co.

MASSACHUSETTS.

March: Investigation of alleged overcharges of the New England Telephone & Telegraph Co. Particular attention will be given to overcharges on tolls and measured service, by which the complainants to the commission contend the company profits more than $150,000 a year in the downtown section of Boston.

MICHIGAN.

March 25: General conference at Lansing between the telephone companies of the state and the commission to arrive at a better understanding of the laws regulating telephone companies.

March: In reply to a copy of resolutions adopted by the Benton Harbor, Mich., common council, asking the commission to investigate telephone rates and other matters concerning public service companies in that city, the commission has asked the council for formal complaints before acceding to the request.

NEVADA.

February 25: Order entered in case No. 2,071 requiring the Bell telephone company of Nevada to stop the practice of requiring a $5 deposit to persons desiring telephone connections. In lieu of discontinuing the practice, the commission allows the company the privilege of requiring the payment of two months' service in advance. The order becomes effective on or before April 1.

NEW YORK.

March 5: Hearing at Syracuse on complaint of C. H. Bennett, and others, of Camillus, respecting the rates of the New York Telephone Co.

OHIO.

March 16: Order refusing to approve joint application of the Newark Telephone Co. and the Somerset Telephone Co. for lease of the property of the latter to the former company, on the ground that the value of the property to be leased is less than the amount stipulated as a basis for a circulation of the rental required to be paid.

PENNSYLVANIA.

March 12: Hearing held at Myersdale, Somerset County, by Commissioner Tone on complaint of the Somerset Telephone Co. regarding alleged discriminatory rates of the Economy Telephone Co.

March 20: Hearing on telephone rates throughout the state resumed at Harrisburg.

March 26: Hearing at Philadelphia in the matter of the complaint of James B. Bonner as to the service and rates of the Bell Telephone Co. of Pennsylvania in Melrose.

WISCONSIN.

February: Decision in the case of the Arena & Ridgeway Telephone Co. against four smaller exchanges in its territory, ruling that the Spring Green exchange shall pay the Arena company $27 per year for switching charges, and that the Arena company pay each of the four exchanges $1 per year per telephone for switching charges.

March 4: Writ of convenience and necessity granted the Independent Telephone Co. of Blue River, to build a line through Grant, Richard, and Crawford counties.

March 11: Decision finding that the Lisbon Telephone Co. violated the law when it extended its line to Lisbon with the commission's authority, but concluding that the commission has no authority to order discontinuance of the line.

Queries on Theory and Practice

Care of Gravity Cells.

We have a magneto board that does not talk up on three wet cells having zinc (crowfoot), and copper cones in each cell, water and blue vitriol. They talk up so dead that we cannot use them but the board works fine on two No. 6 Columbia dry cells. The three cells were with the board and the manager who was here before I came also had trouble. What is my trouble?

Clean out the gravity cells thoroughly and start them all over again. This kind of cell needs close watching to give good results. Add copper sulphate (blue stone or blue vitriol, all names for the same thing) whenever the top of the blue solution sinks low. The blue line should be about half-way between the top of the copper and the bottom of the crowfoot zinc. Clean the crowfoot regularly (once a week).

A gravity cell requires steady current to keep it in good order. If you do not let it work enough, the clear and blue solution will mix and the cell will run down. If there is difficulty in keeping the blue line up, remove some of the top solution (clear) and add fresh water (soft, pure, strained).

Trouble With Ringer.

On a grounded line I have 15 1,600-ohm ringer telephones, all of which work well except one. This party can call central and can ring any one on the line but other parties on the line cannot ring him, only at times. When he rings central or parties on his line, the bells ring good. What can be the cause of this trouble?

Something is wrong with the bell or bell circuit of the particular telephone. It may be faulty adjustment of the armature, clapper, or gongs, or perhaps a loose connection in the wiring belonging to the bell alone. Go over the wiring carefully and solder any suspicious joints. See that the pivots are clear of rust and are just a little loose—not too much but just enough to let the armature vibrate freely with no chance of binding in cold weather.

By trial find the stroke which works best under the conditions used. Run the gongs up close enough just to clear the clapper by the thickness of a thin cardboard when the amature is held over to one side. If all adjusting fails, replace the ringer with a new one. It may have an open in the coils, though this is not likely.

Cross Ringing on Grounded Lines.

We have two grounded lines running metallic through cable and grounded at the terminal can. The lines parallel each

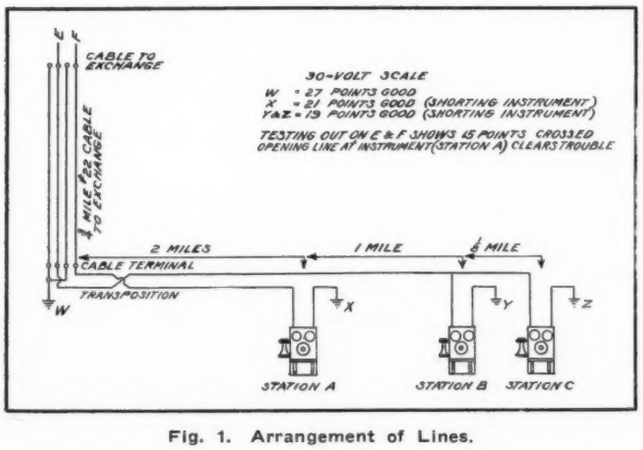


Fig. 1. Arrangement of Lines.

other for two miles to station *A*. As shown in the diagram (Fig. 1.) And one line runs one mile further.

The lines ring crossed. If we ring out on one line, it throws the drop on the other. Testing out on the two lines as shown in Fig. 1, gives us 15 points cross (30-volt scale) and, opening the line at station *A* at the instrument, clears the trouble. Opening the line at stations *B* and *C* does not clear the trouble.

We have inspected the line on every pole from the terminal

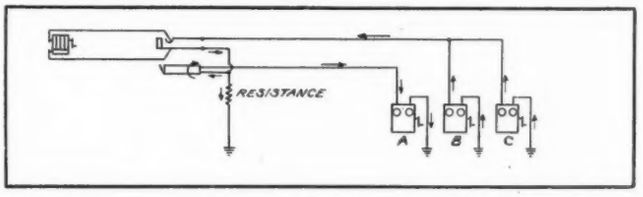


Fig. 2. Conditions if Common Ground is of High Resistance.

can to station *C* and can find nothing to cause a cross or ground. Cross talk looks possible to us but a 15-point cross on the voltmeter does not look possible. If you will suggest the cause we will esteem it a great favor.

This kind of a cross can be found only by careful testing from point to point. Keep close watch of all happenings and make sure, when you are testing with a certain condition, that you really have that condition. We suggest that you open or disconnect the line at stations *A*, *B*, and *C*. Then ring out on one line and see if it throws the drop on the other. Then measure with the voltmeter and see if there is a cross. All tests for crossed lines must be made with the telephones, *A*, *B* and *C*, disconnected. If a real cross exists, this test will show it. If no cross is between the wires, it will ring and test clear.

If the lines are clear, but cross ringing exists when the telephones are reconnected, then look for a poor ground at the end of the cable. Test for it by grounding the two lines separately on good long rods, 10 feet apart, in wet ground. Fig. 2 shows the conditions if the common ground is high in resistance. The current will divide at the end of the cable, part going through telephone *A* and part through the ground as indicated by the arrows.

Measuring Line Insulation.

In the formula, for working out the megohms per mile insulation of line, $x = \frac{V}{D} - 1 \; RM$,

what part does 1 stand for when *M*, the mileage = 17; *R*, the resistance of the voltmeter = 26,000 ohms; *D*, the deflection of the voltmeter = 7 on one side and 6 on the other side; and *V*, the voltage of the testing battery = 80.

I want an easy way as I have about 40 lines to measure every month.

The formula as originally derived stands. $x = RM \; \frac{V-D}{D}$

You will readily see that the fraction $\frac{V-D}{D}$ can be separated into two fractions, $\frac{V}{D} - \frac{D}{D}$. Then the second fraction equals 1, so that we get the expression $\frac{V}{D} - 1$.

We recommend that you construct a curve or table giving the value of *X* for each volt of deflection, *D*, assuming and maintaining the testing battery at 80 volts. With this table posted on your desk, it is an easy matter to get the total insulation resistance of a line. Then by referring to a list of lengths of lines, you can find out how long the line is and by multiplying the total insulation resistance by the mileage, get the insulation per mile.

Organization of Employes' Society at Clinton, Mo.

At a recent meeting of the employes of the Missouri Union Telephone Co., at Clinton, Mo., a new society was organized called The Missouri Union Plant Society, with A. J. Osburn, president, and J. C. Schweer, of Windsor, Mo., secretary. The society was organized so that the employes can meet at regular times and read papers or make talks on their different lines of work.

At this meeting a paper was presented by A. J. Osburn, wire chief of the Missouri Union Telephone Co., of Clinton, Mo., on the subject "Universal Switchboards."

This paper was as follows:

It is conceded by well known telephone authorities that the magneto system will remain the standard equipment for small towns and villages. It is also conceded by the best traffic experts in the country that the full common battery system with its modern refinements will remain the standard for large city exchanges.

The universal switchboard has come now to supply the wants of medium sized exchanges or medium sized towns; also to furnish their patrons with either magneto or common battery service.

I would not recommend the universal system to telephone companies that have plenty of money to purchase a standard common battery board, and telephones all at once. In the case, however, of a magneto exchange that is already established, and where the rates are not justifiable, the company not very prosperous, the pole lines not in very good shape, etc., I would recommend that the company install such an arrangement as this, and by so doing it can get one line in shape at a time, therefore converting everything to common battery gradually and raise the rates accordingly. It will not take long to do this, either, because when the public sees a few of the new telephones around town, and also sees the difference in the service, they will become interested and begin to inquire about it, as to the difference in price, etc. After they find that it costs only a trifle more, others will have their telephones changed also, and very soon you have a full common battery plant and hardly realize how you got it.

Each line terminates at the central office in a universal line and cut-off relay. The magneto subscriber calls central the usual way. The first impulse of current passing through the line relay causes the latter to automatically cut itself out of the line circuit into a local circuit where it is firmly locked up by the 24-volt storage battery, thereby causing the line lamp in the switchboard to burn until the operator answers. The battery does not go out on the calling subscriber's line, and no magneto line ever has the battery on it until it has been changed to the common battery connection at the line relay. All line relays remain locked up, and all lamps in the board burn with equal brightness regardless of the condition of the calling line, its only requirement being the ability to get the one current impulse into the line relay. Any operator can answer remote calls without observing the number of the calling line. When a distant lamp lights, the operator plugs in on its exact level, and in the same location in her panel as that of the calling line lamps in the distant panel. In other words one operator can handle the entire board, when the traffic is low, without leaving her chair.

In the semi-multiple universal system the intermediate frame is dispensed with. In other words, it is right on the face of the board. Each line lamp is carried out to corresponding multiples the same as the answering jacks, only they are soldered to terminals, so that if a line should be placed in another position the only requirement is to slip in a bank of lamp jacks, solder them up and change the lamps from the old position to the new one. An intermediate frame is a very costly device and is seldom used in small or medium sized exchanges.

When it is desired to change a magneto subscriber's line to common battery it is only necessary to change connections at the line relay, which is very simple and quickly done, no new apparatus being needed, aside from the common battery telephone. The subscriber calls central by removing the receiver from the hook, and upon replacing the receiver the supervisory lamp of the cord circuit is lighted, notifying the operator the conversation is finished. She then takes down the connection without listening in, as she knows they are through. If the called party has a common battery telephone the supervisory lamp will light and remain lighted until the party answers; therefore she does not have to listen in to see if he has answered. The operator knows, by the manipulation of her supervisory lamps, which ones are magneto, and which are common battery lines. My experience with the system is, that it works equally well with either magneto or common battery connections.

I believe the system has been designed and perfected to give the highest possible class of magneto service, the highest possible class of rural service, the highest possible class of common battery service, and the highest possible class of interconnections between all these different kinds of service; and all these different classes of service are accomplished through its universal cord circuit, which are as simple or nearly so as the ordinary common battery cord circuits. I have had about 14 months' experience with a board of this kind, manufactured by the Kellogg Switchboard & Supply Co.

Operators Efficiency in Chicago.

In a recent interview General Manager Hill, of the Chicago Telephone Co., stated that the average daily number of telephone calls in Chicago is at present 1,800,000, coming from 340,000 telephones. The calls are handled by 6,000 operators and the company is endeavoring to maintain a standard of 94 per cent. perfect in handling calls. The most common error is that which results in a subscriber getting the wrong number. Tests carried on over a series of years show that about one-third of such errors result from the subscribers giving the wrong number, or the wrong exchange, to the operator. The other two-thirds are due to the mistakes of the operators.

"The chance of error in selecting the exact number wanted out of 350,000 possible numbers is enormous," said Mr. Hill, "and it is remarkable that 'wrong numbers' result in only 3½ per cent. of the total number of calls.

"We have several ways of keeping daily track of the quality of our service. The most important is the observation switchboard. It is located in the main offices of the company and is manned by our most expert and accurate operators.

"Fifty or sixty of the busiest lines in one exchange after another all over the city, are switched on to this observation board and every call going over them is watched and recorded. With a stop watch before her the observation board operator keeps a record of the exact time elapsing between the calling of a number and the completion of the connection. If there is delay we investigate the cause and take steps to prevent its recurrence.

"As a result of this careful work, which goes on continually, we are able to get 96 per cent. of all our calls answered in 10 seconds or less. The average time occupied in completing a connection is only four seconds."

Bell Agreement Does Not Affect Hamilton, Ohio.

President Kilgore, of the Cincinnati & Suburban Telephone Co. has explained that the agreement by which Independent telephone companies may use the long-distance wires of the Bell system will not affect Cincinnati subscribers as the American company has connections now to all the points the Independents reach. The agreement does not include local and toll lines within a radius of 50 miles, so that the agreement will have no effect on the Hamilton situation so far as Cincinnati is concerned.

Garford Mfg. Co. Organized to Succeed Dean Electric Co.

New Company Provided With Ample Capital, Increased Force and Greater Facilities—Official Personnel of the Company—A Description of Its Factory Facilities at Elyria, Ohio—Efficiency Methods and Output—Engineering, Shop and Sales Forces

Announcement was made late last week of the organization of the Garford Mfg. Co., of Elyria, Ohio, with a capital stock of $1,300,000. The new company is the result of a reorganization of the Dean Electric Co. and proposes to continue the manufacture of the products which the late company made so well known in the telephone field.

The officers of the Garford Mfg. Co. are: President, A. L. Garford; vice-president, A. G. Bean; treasurer, A. L. Patrick; and secretary, John H. Watson, Jr. The board of directors is an unusually strong one consisting, in addition to the officers, of John Sherwin, president First National Bank and First Trust & Savings Co., Cleveland, Ohio; H. H. Johnson, of M. B. and H. H. Johnson, attorneys, Cleveland, Ohio; John P. Brophy, vice-president and general manager of the Cleveland Automatic Machine Co., of Cleveland, Ohio; and E. F. Allen, president of the American Lace Co., of Elyria, Ohio.

Mr. Garford, the president, is one of the best known manufacturers in the country. He has been connected with a number of successful manufacturing enterprises and is perhaps best known through the Garfield bicycle saddle, the production of which was his first manufacturing venture, and later through the Garford automobile. Mr. Garford's record in public and private life has been such as to firmly establish his reputation among all who have had any dealings with him or with any organization in which he was interested. He has been active in civic organizations and in the political life of the state. The fact that he has consented to give his name to the company, indicates his faith in its future.

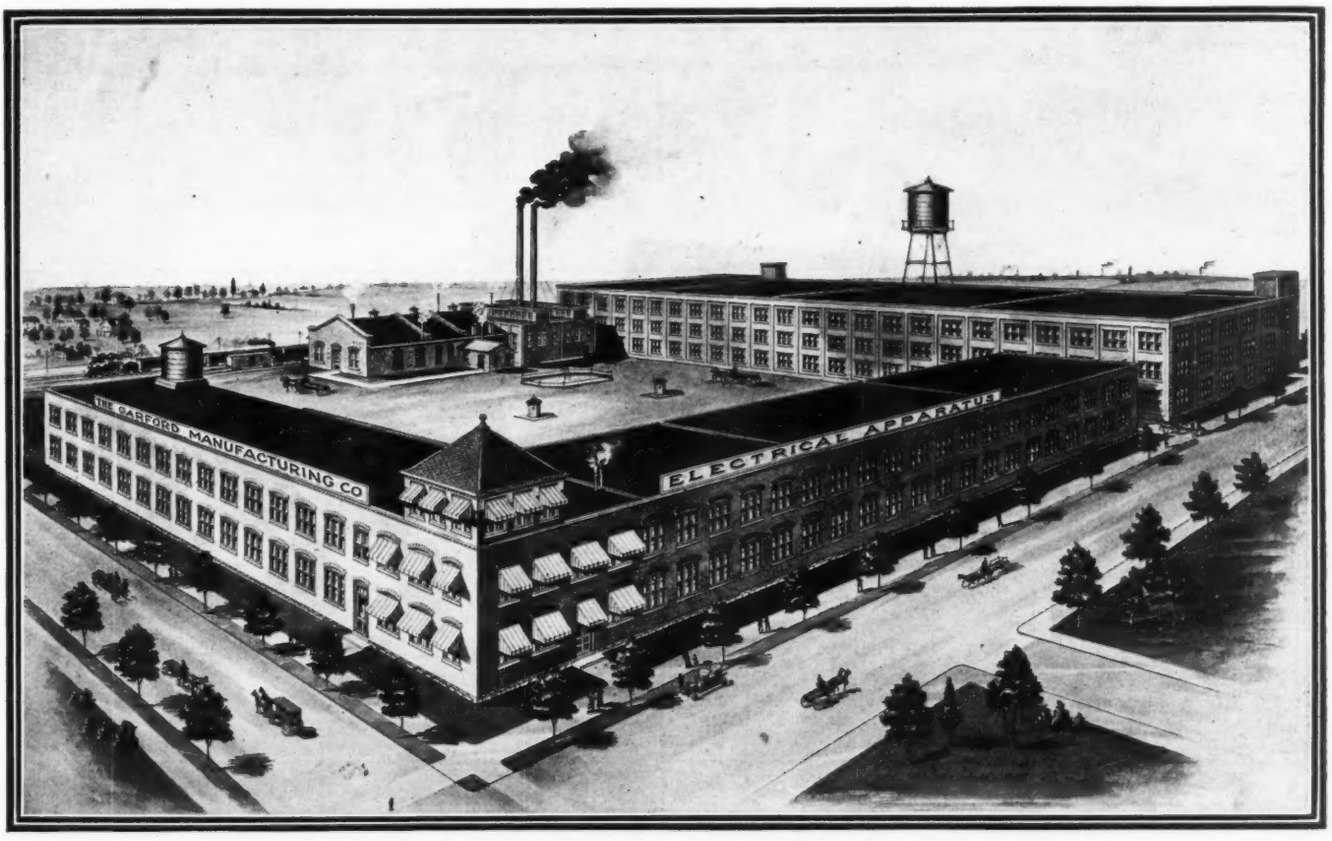
Mr. Bean, vice-president and general manager, was prominently identified with the Dean Electric Co. for a number of years, in high executive positions. He has been closely associated in the upbuilding of the Independent telephone industry through this connection and has been promient at the National conventions.

Mr. Patrick is a graduate of the Massachusetts Institute of Technology and for the past 17 years has been engaged in the accounting and financing departments of various organizations. He has been comptroller of the American Bicycle Co., the Pope Mfg. Co., the Dean Electric Co., the Garford Co., and now assumes the duties of treasurer of the Garford Mfg. Co.

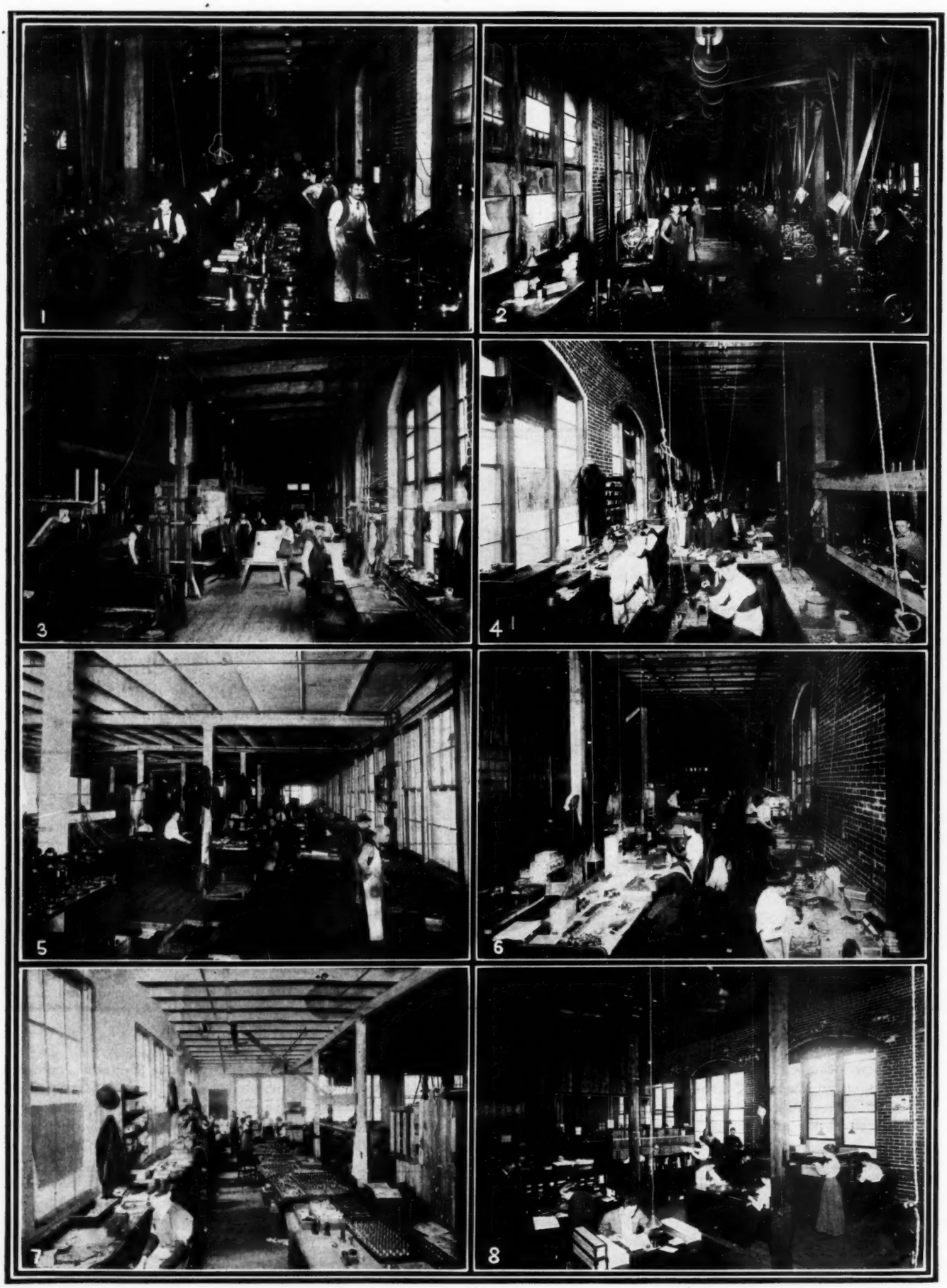
The company will have as its counsel Francis O. Richey, a graduate of the University of Virginia in electrical engineering. Mr. Richey was connected with the United States patent office for a number of years, during which time he took up the study of law, graduating from the National University of Law in 1908, and taking a post-graduate course in patent law at the George Washington University. Since 1909 he has practiced patent law in Elyria, Ohio, the Dean Electric Co. having been one of his clients.

D. A. Glover, the auditor of the company, is a native of Elyria and a graduate of the Oberland Business College. In the latter part of 1909 Mr. Glover became associated with the Dean Electric Co., and now gives to the Garford Mfg. Co. the benefit of the experience of the years since that time.

The plant of the Garford Mfg. Co. is located one mile from the public square of Elyria, Ohio, occupying some 12 acres



Birdseye View of the Manufacturing Plant of the Garford Mfg. Co. at Elyria, Ohio.



INTERIOR VIEWS OF THE PLANT OF THE GARFORD MFG. CO., ELYRIA, OHIO.

1. Tool Room—2. Automatic Screw Machine Department—3. Cabinet Shop—4. Apparatus Assembly—5. Assembling Department, Telephone Section—6. Winding Room—7. Assembling Department, Transmitter and Receiver Section—8. Shop Offices.

of level land adjacent the main line of the transcontinental trunks of the New York Central system. A private switching spur, 700 feet in length, joins all of the company's buildings.

The highways toward the center of town are well macadamized or paved with brick. A car line within one block of the factory not only furnishes intra-city facilities, but operates between Cleveland and other cities south and west, connecting with other suburban lines throughout the state.

The structures include a main L-shaped, two-story factory of brick and mill construction, having a total floor space of about 25,000 sq. ft.; one three-story structure of brick and mill construction 240ft. x 60 ft. inside dimensions, with elevator service at either end; a one-story brick building, 80 ft. x 70 ft.; a brick powerhouse 70 ft. x 80 ft.; and one building, 80 ft. x 150 ft. They are carefully maintained, great attention being paid to light and sanitary conditions. The buildings have been erected, as shown in one of the illustrations, in the form of a square, with a large court in the center, so that all floors are well lighted. Areaways between buildings are covered, permitting employes to pass from one building to another without exposure to weather conditions.

More than ample fire protection facilities are furnished by a storage pool containing constantly 150,000 gallons of water while a large tank of special construction on top of the three-story building, contains 65,000 gallons. In order to provide for the safety of this tank containing this great weight, steel girders, or legs, run through the inside of the buildings and are set in cement piers in the basement. The tank is reached from the roof of the building by small iron ladders and inspection is made daily both for leaks, choked inlet and outlet pipes and to see that the water depth is constantly maintained.

There is also a tank on the two-story building with capacity of 20,000 gallons. It is of similar construction to the larger tank and is subject to the same care and inspection. These tanks are connected with a sprinkler system, provided with Grinnell glass button, automatic sprinklers, the valves of which fuse at a heat of 150 deg. Fahr. There is a sprinkler valve for every eight square feet throughout the property. Should a fire occur from any cause whatsoever, it would be confined to this extremely small area as the heat would cause the sprinkler valve to open, releasing water in sufficient quantity to be easily capable of extinguishing the hotest blaze within the area of the valve. The tank pressure is approximately 40 pounds to the square inch throughout the entire system.

There are also water curtains between each of the buildings, so that in case of an explosion, causing a severe conflagration in any one of the buildings, the sheet of water between the buildings would make a safety curtain, which would be almost prohibitive to the blaze crossing over and would also prevent the heat from breaking the windows.

At least 50 pounds steam pressure for use in the 750-gallon per minute Fire Underwriters' pump is always maintained. This pump is said to be much more powerful than any street engine. Its flow can be applied to the sprinkler system, or directly through the company's 1,800 ft. of hose to any part of the property. The hose is stored at various fire stations. There is a volunteer fire brigade among the employes, and the brigade, through constant practice, promote safety during the working hours.

In addition to the company's facilities for fire protection, an 8-in. main is tapped by three fire hydrants immediately adjoining the property and one other hydrant on a 6-in. city main. There is also a city fire house within two blocks of the plant.

The company's power facilities consist of two Sterling type, Babcock & Wilcox water tube boilers which provide steam for operating two Ball horizontal, cross compound engines coupled to two Crocker-Wheeler 200 kw. generators. These generators are easily capable of 50 per cent. overload for several hours. There is a total of about 750 horsepower available at any time during factory hours. This is large enough to supply electricity for lighting and for ordinary power purposes in a city of 25,000.

A. L. Garford.

A. G. Bean.

H. H. Johnson.

The Garford Manufacturing Co.'s offices are divided into administrative, sales, purchasing, accounting, stenographic, engineering and factory. These departments are all located in the main building, the sales, accounting, purchasing, and stenographic departments occupying offices on the first floor. The administrative, engineering and factory offices, as well as the physical laboratory and the experimental shop are located on the second floor.

Descriptive of some of the duties of these departments, it will be of interest to know that the Garford Mfg. Co. has in stock, or in process at all times, in the neighborhood of 10,000 different parts and about 3,300 different sizes and kinds of raw materials used to manufacture these parts.

The engineering department is responsible for the original designs of all models and apparatus. The experimental shop works up these designs and careful drawings are made of the models for the benefit of the operating departments. All of

these 10,000 pieces are made absolutely to drawing and subjected to careful inspection before being passed to the stockrooms to be later assembled into telephones, switchboards, etc.

A highly efficient system for maintaining this stock has been carefully worked out and it shows, at all times, the exact condition of any particular part or material. These parts are listed in the company's advertising matter handled through the sales department, so that when an order is received through the sales department, it bears the code numbers of the particular pieces the customer requires.

Orders are edited in the engineering department and pass to the factory office and then to the output department. If the factory finds that the stock is low on this particular part, it is "chased" in order to facilitate shipment, or, if stock is in satisfactory condition, the output department will fill the order upon the day it is received.

This same careful system of supervision is maintained throughout the shop. There is a constant check, by operations, on the multitude of parts, so that an accurate cost is obtained on every item. By means of this system a perpetual inventory is kept, thus eliminating the necessity of tying up the shop, or closing down, for an annual physical inventory. The factory office verifies the records from time to time, so there is but slight possibility of errors creeping in.

The stenographic work is confined, under general supervision, to one office. It has been reduced, by introduction of dictaphones, to about one-half of the cost when the stenographers were scattered throughout the various offices.

Elaborately appointed administrative offices are arranged for the president, vice-president and general manager, treasurer and chief engineer of the company. A visitor will find the same efficiency in the office quarters as throughout the shop. As the detail in the other offices is enormous,, the natural consequence is much detail and careful work in the accounting department, which is the final link between the customer and the company.

The factory proper contains the power department, which has already been described; and the shipping department with all modern methods and facilities.

A service department is in operation in an isolated building where the millwrights, electricians, plumbers, janitors and watchmen are located and who report to but one head.

The repair department is a distinct and interesting department. Employes in this department are naturally highly efficient, as they must repair apparatus, which is returned by customers, and which has passed through every other department in the building.

In the process stock room are located the stocks of the 10,000 parts previously mentioned. This stock is carefully kept in enclosed rooms. The stockroom covers three-quarters of the building, 240 ft. x 60 ft. The steel stock racks reach from the floor to a 16 ft. ceiling, and facilities are available for reaching every steel pan in them. Each pan bears a record similar to the stock record kept in the factory office and a check is made from time to time to see that they always agree. No one is admitted to these stockrooms except employes therein. No goods are taken in or permitted to go out without a proper record, thereby increasing the high efficiency of the stockroom.

The raw material stockroom occupies a space 50 ft. x 60 ft. on the first floor of the three-story building. In this stockroom are hundreds of varieties and sizes of steel, brass, German silver, fibre, rubber, castings, wire, tubing, etc.

In the tool stockroom, the punch press and automatic screw machine departments would attract attention anywhere. In this tool stockroom are kept thousands of dollars' worth of perishable tools and materials for making them. The methods in this department are as highly efficient as throughout the rest of the factory.

The merchandise stockroom, where all merchandise stocks or finished apparatus are carried, is also the output department. Here are to be found telephones, jacks, keys, etc., ready for immediate shipment. This stock is maintained constantly, a maximum and minimum being established on every part.

The punch press department occupies the first floor of a three-story building. The presses range in size from foot power presses to presses of 15 tons. The Garford Mfg. Co. is very proud of this department because of the full equipment for making the difficult apparatus the company produces. During rush periods when the company has tried to have some of its work done on the outside, even offering to furnish its own tools, the work has been refused because of the carefulness and experience required.

The milling and drilling department on the second floor of the original building occupies a space 140 ft. x 60 ft. In this department is the best and most modern machine that can be obtained. Each operation is subjected to careful inspection, to insure the output being of a superior quality. Much of the machinery is special and was designed to facilitate the rapidity of output, as well as quality of product.

The automatic screw machine department occupies space on the first floor of the three-story building about 40 ft. x 200 ft., and contains a fine battery of modern automatic machines.

The iron frame department, of which the blacksmith department is a factor, makes all of the iron frames for switchboards, etc., used in large installations. This is an extremely interesting department and occupies the first floor of the original building approximately 60 ft. x 150 ft. with the exception of the portion devoted to the manufacture of condensers. This condenser has a reputation of its own.

In the polishing and plating department modern automatic machinery has been installed with the result that polishing costs have been reduced and output increased.

The cabinet department produces a well known product. This department occupies space 60 ft. x 180 ft. It contains all the most modern wood working machinery, supervised by recognized experts. Naturally, closely allied with this is the wood finishing department, and the same high efficiency is maintained as in the cabinet shop.

The general assembly department occupies the third floor of the newest building about 200 ft. x 60 ft. and this is laid out in a most efficient manner. The benches are all at right angles with the walls of the building and are well lighted. Steel stock racks and pans installed between them, contain different stocks in process of assembly, and as all of the 10,000 different pieces pass through this department to be assembled in various kinds of telephone products, it is an extremely interesting and busy place.

A portion of the room is devoted to receivers, another portion to transmitters and a section to telephones; another section to generators, and other space to jacks, to drops, and to keys. The different sections merge in a manner to provide the utmost efficiency. The work passes from this department to the inspection department, where it is carefully inspected before it is permitted to enter the merchandise store.

The special assembly department is devoted to the most intricate and delicate work and contains only the skilled and specialized workmen, and visitors to the factory are always interested in it.

The switchboard department occupies a portion of the second floor of the original building 150 ft. x 40 ft. All switchboards and converters are here assembled. The

switchboard section has always been extremely flexible. For example, it was not crippled when it had to turn out simultaneously such jobs as that for the big Detroit offices, and for Saginaw, Mich., in addition to the normal output.

The tool room, which is located on the first floor of the three-story building, occupies a space 80 ft. x 60 ft., in close proximity to the tool stock room and punch press and automatic screw machine. The machinery is the newest and the best that can be secured, expert opinion having dictated the purchase of each machine. Employes of this department are the highest paid men in the shop and their ability is shown in the dies which produce the company's stampings. The enameling room is also an extremely busy and efficient department and occupies an isolated brick building 60 x 70 ft. containing the ovens, finishing rooms, enameling tanks, etc. In the enameling room, all modern processes are used, such as the air brush, hand brush, dipping, etc. Here the work is rubbed down and polished, and the place being dustproof, a remarkably successful product results.

All of these departments are distributed through the company's modern plant in such a manner as to promote the utmost efficiency. The lighting and sanitary conditions are of the best. Everywhere the employes' welfare has been considered. Even before the state laws required such protection, guards for machinery were installed in the company's shops. The plant is pointed out by inspectors as being model in every respect.

The Garford Mfg. Co. by reason of acquiring of the vast manufacturing and operating experience of the old Dean company, is in a most satisfactory position in the work of designing and providing telephone exchange equipments, from the very largest down to the smallest units. During the last 10 years, the Dean company has produced from raw material over 50 large central office equipments. The Detroit installations constituted, it is said, the largest single order for equipment ever placed with an Independent manufacturer. The Detroit main office has an ultimate capacity of 15,000 lines, with an operating installation of 8,000 lines, all being arranged for four-party harmonic selective ringing. This equipment included three complete branch offices, a large multiple toll board, complete telegraph equipment and all of the substation instruments. Other notable installations have been made at Cleveland, Saginaw, Scranton, Quincy, St. Joseph and Mobile.

The company has maintained several branches and at this time has branches established at Sumter, S. C., Kansas City, Mo., Los Angeles, Cal., and Seattle, Wash. The company also has customers in many foreign countries.

The United States government uses large quantities of Dean telephone apparatus, including magneto and common battery switchboards, magneto and common battery telephones, all for permanent installation.

In addition, the United States Signal Corps has ordered a great many of portable telephones for field and camp use, and also artillery sets for coast fortifications.

The Dean Electric Co. has established an enviable reputation for rush installation on fire jobs, and this will be sustained by the new company. Readers of TELEPHONY are familiar with the phenomenal record made in a Texas installation and also in the installation at Scranton, Pa.

The production interests of the Garford Mfg. Co. will be under the direction of Ray H. Manson, chief engineer; S. A. Beyland, assistant chief engineer; J. G. Millspaugh, factory manager; L. E. Bonsieur, factory superintendent; and George Kunkel, master mechanic.

F. O. Richey.

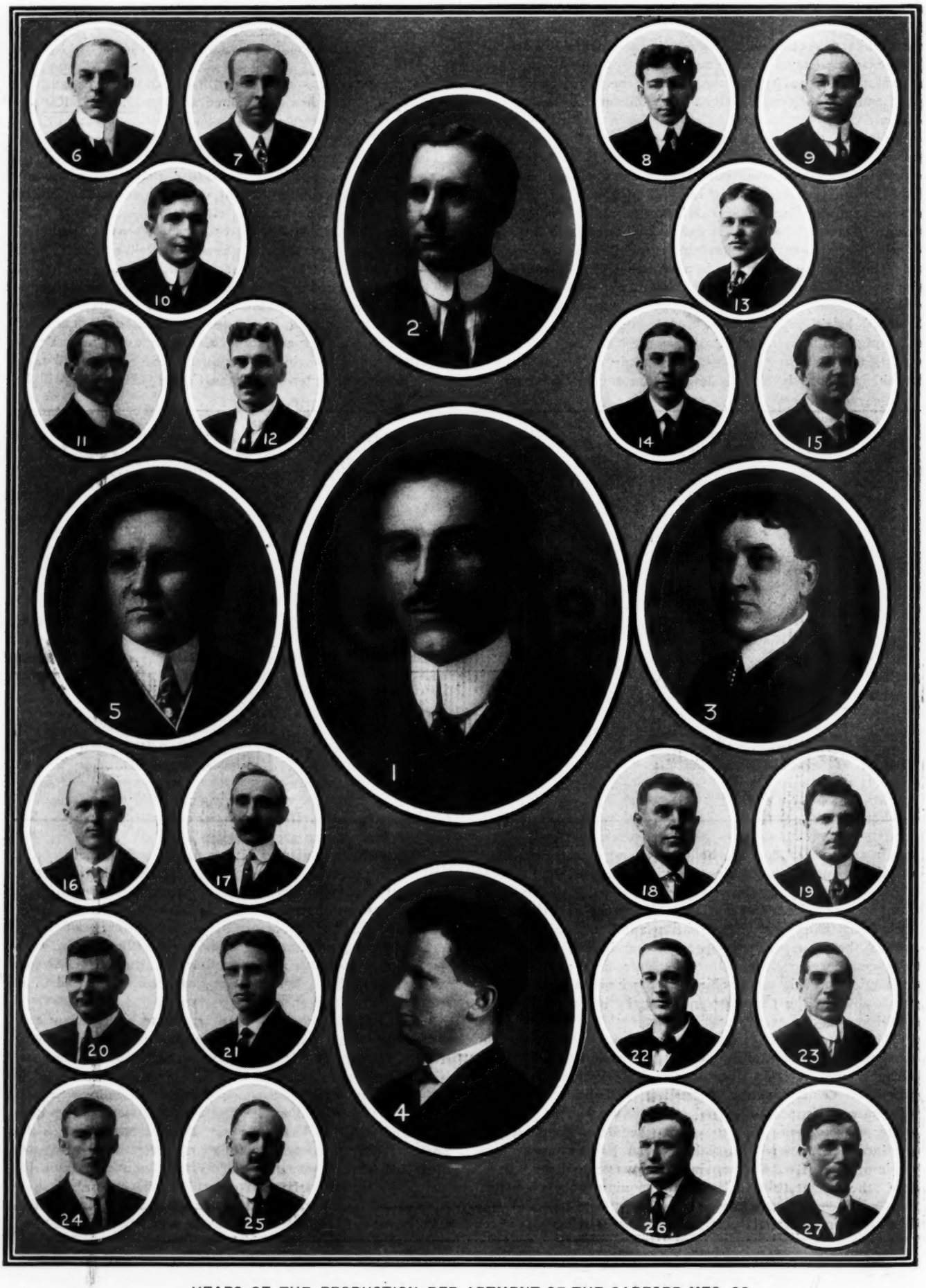
D. A. Glover.

L. A. Patrick.

The sales end of the Garford Mfg. Co. is in charge of George A. Scoville. As managers of branch offices the Garford company has A. J. Roberts at Kansas City, Mo., Joseph M. Abrams at Seattle, Wash., F. W. Coker at Los Angles, Cal., and C. H. Annis at Sumter, S. C.

RAY H. MANSON, who is well known to Independent telephone men, is a graduate of the University of Maine, in electrical engineering. His telephone experience dates from 1899 when he became connected with the Western Elctric Co., of Chicago. He was later associated with the Kellogg Switchboard & Supply Co. in engineering and sales work. He became connected with the Dean Electric Co. in 1904, and since that time has been active in inventing and perfecting a great deal of the equipment manufactured by the Dean company. His inventions in telephone and other lines have resulted in 70 patents and 30 applications for patents. Mr. Manson for three years was sales engineer of the Dean company and in 1911 became its chief engineer, which position he occupies with the new company.

SIDNEY A. BEYLAND, assistant chief engineer, is a native of Kentucky and a graduate of the University of Tennessee, also taking a post-graduate course in electrical engineering in the



HEADS OF THE PRODUCTION DEP ARTMENT OF THE GARFORD MFG. CO.

1. Ray H. Manson—2. S. A. Beyland—3. L. E. Bonsieur—4. Geo. Kunkel—5. J. R. Millspaugh—6. George E. Roberts—7. J. C. Snyder—8. R. A. Rawson—9. F. J. Wadsworth—10. W. R. Schall—11. J. Pehrssen—12. John Halldow—13. P. K. Wood—14. G. A. Welch—15. August Miller—16. W. A. Schmittgen—17. R. Weisman—18. F. T. Michell—19. Fred Mizer—20. J. H. Brown—21. Ira Bainbridge—22. E. R. Jones—23. H. G. W. Snyder—24. J. H. Sigsworth—25. J. E. Riley—26. J. J. Buckley—27. Fred Stegman.

THE SALES FORCE OF THE GARFORD MFG. CO.

1. Geo. A. Scoville—2. A. J. Roberts—3. Jos. M. Abrams—4. F. M. Coker—5. C. H. Annis—6. H. L. Harris—7. W. C. Strong—8. F. L. Clark—9. R. M. Allen—10. W. H. Scott—11. H. Stevens—12. E. L. Klingel—13. A. B. Smith—14. H. H. T. Giessner—15. E. E. Piper—16. C. L. Ward—17. S. O. Vaughan—18. P. Winemiller—19. R. G. Faulhaber—20. E. G. Fehrenbach—21. G. S. Monfort—22. R. Davis—23. J. D. Kratz—24. M. D. Wood—25. I. E. Loewenberg—26. F. J. Buol—27. R. F. Peters—28. S. L. von Almen—29. G. L. Ferguson—30. P. Cornell.

same university. His entrance in the telephone field was from the manufacturing end, having been employed by the Southern Brass & Iron Co., which, at that time, handled the Sumter telephones. He later was local manager of the telephone exchange at Bristol, Va., and after service in the Spanish-American war, became connected with the Western Electric Co. in Chicago. A position in the engineering department of the Kellogg company being offered him two years later, he accepted, and upon the organization of the Dean Electric Co., in 1904, became its assistant chief engineer. Since that time he has had entire charge of all switchboard designs and specifications, as well as assisting in the designing of apparatus.

J. R. MILLSPAUGH, factory manager, was born in Ohio. His experience includes three years with the Hamilton-Kenwood Cycle Co., where he became interested in factory organization and systems; two years with the C. J. Smith Hardware Specialty Co., in Milwaukee; a short service with the old E. P. Allis Co.; and then with Montgomery Ward & Co. and Sears, Roebuck & Co., Chicago, where he changed from one department to another, gathering information as to the company's systems of handling merchandise. He subsequently entered the employ of Swift & Co., and later returned to the A. P. Allis Co., which was reorganized soon thereafter under the name of the Allis Chalmers Co. He remained with this company for two years in various departments. His next experience was as chief clerk with the Mills Novelty Co., for which he installed a factory system. He also installed the factory system in the Vulcan Iron Works, and then entered the sales department of the Lehigh Valley Coal Co., but was soon transferred to its accounting department, where he remained for three years revising the methods. His next connection was with the Western Electric Co. in Chicago, where he revised the machine loading rates, installed a cost system in the company's brass foundry and took charge of its expense accounting department. Five years ago Mr. Millsbaugh entered the employ of the Dean Electric Co. and gave that company the benefit of his extensive experience.

L. E. BONSIEUR, the factory superintendent, received his early education in Florida, finishing it in Ohio. He was in the employ of the Rawson Electric Co., of Elyria, Ohio, in the manufacture and installation of the company's apparatus. Upon the organization of the Dean Electric Co., Mr. Bonsieur was placed in charge of the installation of its power equipment. He was later made assistant foreman of the switchboard department of the Dean company, and two years later became foreman. He steadily advanced through all departments of the shop and after three years was made assistant factory superintendent, becoming three years ago factory superintendent for the Dean company.

GEORGE KUNKEL, master mechanic, is also a native of Ohio. At the age of 14 he began an apprenticeship to learn the machinist trade. After completing his apprenticeship, he worked at his trade for a short time and then for several years followed up various lines of tool and die making in some of the largest plants in the East and Central West. He became foreman of the punch and die rooms of the Dean Electric Co. and later was made master mechanic of the company.

GEORGE E. ROBERTS, apparatus engineer, was born in Rochester, N. Y., and was educated in the public schools there and also at the Rochester Athenaeum and Mechanics Institute. He was employed for a number of years at the Microcosm, a natural science laboratory at Washington, D. C. He was engaged in the preparation of numerous models of various kinds for exhibition purposes. He was later associated with the U. S. Geological Survey in special research work. In connection with his work at the Microcosm, he was awarded a diploma and bronze medal at the St. Louis Exposition in 1904 on a number of working models which he had made. Two years' experience in the employ of Stromberg-Carlson Telephone Mfg. Co., in its exchange equipment and cabling division, prepared him for a position in the engineering department of the Dean Electric Co. in 1907. Since that time he has been employed in various capacities, having had charge of the drafting room, and is at present acting as assistant to Mr. Manson.

In addition to those named, the shop organization includes the following: J. C. Snyder, switchboard engineer; R. A. Rawson, ironwork department; F. J. Wadsworth, plating department; W. R. Schall, switchboard engineer; J. Pehrrsen, apparatus engineer; John Halldow, experimental engineer; P. K. Wood, inspection department; G. A. Welch, switchboard department; August Miller, cabinet department; W. A. Schmittgen, tool room; R. Weiseman, punch press room; F. T. Mitchell, automatic screw machine department; Fred Mizer, milling and drilling department; J. H. Brown, winding department; Ira Bainbridge, assembling department; E. R. Jones, assembling department; H. G. W. Snyder, stockroom; J. H. Sigsworth, output department; J. E. Riley, shipping department; J. J. Buckley, millwright; and Fred Stegman, plant engineer.

GEORGE A. SCOVILLE is a Missourian, but was educated in the public and high schools of Chicago, after which he moved to California and took up electrical engineering at Leland Stanford University. He had two years' experience in the testing department of the Edison Electric Co. in Los Angeles after graduation. His early telephone experience was with the Western Electric Co., in its shop installation and engineering departments. Shortly after the organization of the Dean Electric Co., he entered its engineering department and in 1906 became sales engineer. Later he was sent by the Dean company to the Pacific Coast to develop business. Mr. Scoville spent four years there, and in 1912 returned to Elyria, to become sales manager, which position he continues to occupy in the new organization.

A. J. ROBERTS, manager of the Kansas City branch, is a native of Ohio and his first telephone experience was with the Kellogg company in its Cleveland office, from where he later obtained sales experience in the Ohio territory. After three years' connection with the Kellogg company and one year's association with the North Electric Co., Mr. Roberts took a position with the Dean Electric Co. and spent four years in Elyria and for the past four years has been located in Kansas City.

JOSEPH M. ABRAMS, manager of the Seattle branch office, was born in San Francisco and has confined his business activities to that city. Mr. Abrams joined the Dean forces in 1908 and has for five years been an able assistant in the San Francisco branch house.

F. M. COKER, manager of the California company, is a Georgian and obtained his education through the "school of hard-knocks." He became a telegraph operator and later entered the employ of the Atlanta Standard Telephone Co., working his way through various departments from wireman's helper to the switchboard. Experience with Eastern companies in both operating and installation followed in rapid succession for two years. Mr. Coker then went West and entered the employ of the Los Angeles Home Telephone Co., in whose employ he remained four years, working up to acting manager at Oxhard and Santa Paula. Other operating experience was obtained with the Portland Home Telephone Co., and later with the Bell and Independent companies in San Francisco. In 1910 Mr. Coker became a representative in Southern California for the Dean Electric Co. and now becomes manager of the Garford company's California branch at Los Angeles.

C. H. ANNIS, secretary of the Sumter Telephone Supply Co., Sumter, S. C., is a graduate of the Oberland College, and upon graduation, in 1907, entered the employ of the Dean Electric Co. In the latter part of 1909 he went to Detroit with the Detroit Home Telephone Co., and later to the Kansas City office of the Dean company. Recently he was transferred to Sumter, S. C., where he continues in the interests of the Garford company.

F. J. BUOL is a native of Wisconsin and received his first

telephone experience with the Western Telephone Mfg. Co., in Chicago. In 1905 he entered the employ of the Dean Electric Co. as installer, and later was transferred to the sales department, traveling in southern Texas. For three and one half years, he was chief engineer of the Peoples Telephone Co., of Butler, Penn., and last year returned to the Dean company as manager of service and chief installer.

WM. H. SCOTT was born in Kentucky and entered the employ of the City Suburban Telephone & Telegraph Co., of Cincinnati, Ohio, at the age of 17 in the capacity of lineman. He remained with this company eight years, having been promoted to foreman and later to manager of the Hamilton, Ohio, exchange. In 1898 he became superintendent of construction for the Memphis, Tenn., Telephone Co., and two years later accepted the position of manager of the Peoples Independent Telephone Co., at Paducah, Ky. In 1901 he became superintendent for the Citizens Telephone Co. and the Lone Star Long Distance State Co. In 1905 he severed his connection with these companies and affiliated himself with the Dean Electric Co., as traveling representative. At present Mr. Scott is representing the Dean company in the Michigan district.

ROBERT F. PETERS is a native of Elyria, Ohio, and began his telephone experience in the inspection department of the Dean Electric Co., where he remained for four years. He was then promoted to the shop office and later to the sales department, where he is employed at the present time.

I. E. LOEWENBERG received his experience in the employ of the Forse Mfg. Co., the Saxon Mfg. Co. and the Castle Lamp Co., and in 1913 became associated with the Detroit, Mich., branch of the Dean Electric Co., where he is now located.

HOMER STEPHENS, special man in the Kansas City office of the company, received his experience with the Central Union Telephone Co. and the Kansas City Home Telephone Co., and entered the employ of the Dean Company in 1908.

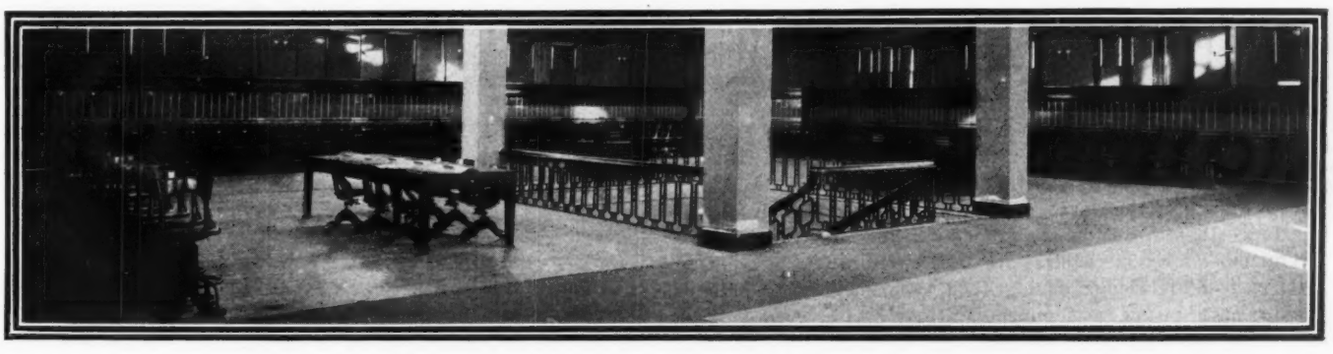
S. L. VON ALMEN began his telephone career with the Kellogg company in 1898, where he remained until 1904, when he went to Appleton, Wis., as manager of the Fox River Telephone & Telegraph Co., which position he held until the company sold out to the Bell, in 1912. For a short time he was with the Southeastern Long Distance Telephone & Telegraph Co., of Olney, Ill., and he was also manager of the Clinton County Telephone & Telegraph Co., of Carlyle. In June, 1913, Mr. von Almen resigned the latter position to accept the position of sales representative with the Dean Electric Co.

M. D. WOOD received his first telephone experience in the employ of the Western Electric Co. of New York, rising to the position of foreman and later being transferred to the Kansas City office, and then to the Chicago office, of the company. He then accepted a position with the Central Union Telephone Co., after which he joined the Dean forces in the installation department. For a short time he left the Dean company to accept a position as switchboard manager at St. Joseph, Mo., and later affiliated himself with the Bell company at Kansas City. When an opportunity was afforded him, Mr. Wood was glad to get into the selling business and accepted the position of Ohio sales representative for the Dean Electric Co., in which position he is still located.

PAUL CORNELL received his education in the public and high schools of Columbus, Ohio, after which he took a course in the Ohio State University, graduating with a B. A. degree in the spring of 1913. Since that time he has been associated with the Dean Electric Co. in its advertising department.

S. O. VAUGHAN received his experience with the Boonville, Mo., Independent Telephone Co., the Sterling Electric Co., of La Fayette, Ind., and the Sedalia Home Telephone Co. In 1909 he accepted a position in the installation department of the Dean company. About a year later he left the company to take charge of the switchboard department of the Kansas City, Mo., Home Telephone Co. In the fall of 1912 he became associated with the House Electric Co., at Kansas City, and in April 1913 re-entered the employ of the Dean company and is now traveling sales representative in the state of Illinois.

G. S. MONTFORT'S first acquaintance with the telephone business began before he left school, in the capacity of night operator. Later he worked as lineman and troubleman for the Independent company at Greensburg, Ind., and for the Central Union company at Marion and Terre Haute, Ind., after which he accepted a position as switchboard installer for the Sterling Electric Co., from which position he rose to salesman for the company. At a subsequent period he spend 15 months building and installing a 2,400-line common battery switchboard for the Peruvian Telephone Co., at Lima, Peru, S. A. Returning to the States, Mr. Montfort again associated himself with the Sterling company. When this company changed hands, he became salesman for the Holtzer-Cabot Electric Co., and in 1912 re-entered the employ of the Dean company as sales representative for Indiana.



View of Installation Showing Type of Switchboard Equipment The Garford Mfg. Co. Will Continue to Develop.

PRICE WINEMILLER was educated at the Delaware, Ohio, high school and the Ohio Wesleyan University. In 1906, about a year after his leaving school, he became associated with the Dean company. In 1908 he left the company and went to Buffalo with the Ericsson company and a year later he returned to the Dean company. He remained in the switchboard department for three years, the installation department three years, and has occupied his present position as Ohio sales representative for one year.

W. C. STRONG received his experience in the employ of the Lockwood-Taylor Hardware Co., of Cleveland, Ohio, the Eclipse Electro & Engraving Co., of the same city, and the North Electric Co., of Cleveland. In 1906 he severed his connections with the latter company to accept a position with the Dean company as order clerk, from which position he has risen to manager of the order department.

CHARLES L. WARD made his first acquaintance with the telephone business as troubleman for the Western Telephone Co., of Unionville, Mo., becoming manager of the exchange a year

later. He has held various positions with the Missouri & Kansas Telephone Co., St. Joseph, Mo., and the Pioneer Telephone & Telegraph Co., of Oklahoma City, Okla. For a year he acted as salesman for the North Electric Co., of Cleveland, Ohio, and was for several years in the employ of the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y. In 1911 he joined the Dean forces as Arkansas sales representative.

RICHARD G. FAULHABER attended the Elyria Business College, Elyria, Ohio, where he studied bookkeeping and stenography. Before his course was fully completed he accepted a position with the Dean company in the sales department, which position he held for four years. Last spring Mr. Faulhaber was transferred to the Kansas City branch.

R. M. ALLEN is a graduate of Earlham College, Richmond, Ind. After graduation, he entered the employ of the Bobbs-Merrill Publishing Co., of Indianapolis, Ind., but left four months later to accept a position with the Nordyke & Marmon Co. in the cost department. He later went into the hardware business with his brother but was compelled to sell the store after a short time on account of his brother's ill health. He then became associated with the Forse Co. and after the Dean company took over the Forse speedometer, he accepted a position in the sales department of the Dean company as manager of accessories.

E. L. KLINGEL received his experience with the Bell company in various capacities, and as manager of the Kanavagh Telephone Co., at Effingham, Ill. In 1907 he became salesman for the Dean company in Ohio. In 1912 Mr. Klingel was transferred to St. Paul, Minn., at which place he is now located.

E. G. FEHRENBACH entered the telephone field in 1898 when he started as night operator and troubleman. His practical exchange experience has been extensive, varying from that of trouble shooter and lineman to manager and engineer. He has also been foreman of some very large switchboard installations for the various manufacturers. He is now with the Kansas City branch of the Garford company as sales engineer.

H. HALL T. GLESSNER is a graduate of the Drexel Institute, of Philadelphia, in mechanical arts and electrical engineering, his theoretical knowledge having been supplemented by practical experience during his summer vacations. After graduation, he held various positions, with the Western Electric Co., the Philadelphia Bell company, in the engineering department, also the position of assistant to the equipment engineer of the Colorado Telephone Co., Denver, Colo., and as superintendent of the Overland Telephone Co. at Phoenix, Ariz. In the early summer of 1912, Mr. Glessner became a member of the Dean organization and is today Washington representative of the Garford company.

H. L. HARRIS, sales engineer, started in the telephone business as night operator for the Central Union Telephone Co., at Painesville, Ohio. He worked as lineman and troubleman for two years after his graduation from high school. He has held responsible positions with the Union Construction Co., of Cleveland, the Central Union Telephone Co., the Cleveland Telephone Co., the North Electric Co., the Cuyahoga Telephone Co., the United States and Federal companies, and in 1907 joined the Dean forces as switchboard engineer. Two years later he was placed in charge of the installation department and in 1912 was transferred to the sales department.

R. DAVIS was educated in the public schools of Elizabeth City, N. C., and the Atlantic Collegiate Institute. He helped to build and operate a telephone exchange in his home town, where he remained for five years. For two years he was employed as manager of the Kanawha Telephone Co. and later became manager of the Triple-State Electric Co., of Charleston. He then resigned the management of this company to become traveling representative for the North Electric Co., leaving to become affiliated with the Dean company as sales representative in Pennsylvania.

F. L. CLARK received his experience with the Metropolitan Elevated Road, of Chicago, the Chicago Telephone Co., Stromberg-Carlson Telephone Mfg. Co., of Rochester, and the National Telephone Co., of Wheeling, W. Va. He resigned the latter position to become a member of the engineering staff of the Dean company and was later transferred to the sales department. Mr. Clark now holds the position of manager of the Homelite department.

The Telephone Fight at Brownwood, Texas.

After a long fight the city council of Brownwood, Texas, has passed an ordinance granting the Brown Telegraph & Telephone Co. a franchise to build and maintain a local and long distance telephone exchange in the city. This company first sought to build a toll line into Brownwood more than two years ago, but was defeated by the opposition of the commercial club before the city council, which objected to a dual system. Under a court injunction, however, the company built its line and established its toll stations. Opposition on the part of the city and the West Texas Telephone Co. was continued in a case that was carried to the court of appeals and then to the supreme court of Texas. The courts sustained the right of the Brown Telegraph & Telephone Co. to the use of the streets under the state law.

The question became a local political issue and at an election a new council was elected largely, it is stated, on account of the opposition of the old councilmen to the new telephone company. Having decided, on account of a change in residence, that it would be better to have a local exchange in Brownwood, the Brown Telegraph & Telephone Co. made application to the new city council for a local and long distance franchise. M. L. Brown, president of the company, states that the opposition opposed this application before the city council with "such a volume of typewritten manuscript as is rarely seen this side of the supreme court" and which would "make a book almost as large as an ordinary history of Texas." The ordinance, however, was advanced to final passage.

Telephoning From a Moving Hand Car.

George Neel of Abilene, Texas, is experimenting with a telephone attachment and equipment invented by him which has been successfully used to communicate from a moving hand car to points several miles away. He has demonstrated his invention to railroad officials in Arizona, who are said to have taken up the device. An experiment was conducted recently from a hand car on the Texas & Pacific R. R., near Abilene. The operator on the hand car called a number of places and it is said could be distinctly heard while the hand car was going at a fast rate.

Along the ties of the railroad a wire is run with cogs or barbs sticking up. The wire is sufficiently insulated so as not to form a short circuit with the rails, which are also used as the ground or return circuit of the telephone system. The wheels of the train, on which the telephone is installed, form the connecting link with the return circuit while a brush of steel sweeps over the cogs of the wire on the ties thus completing the circuit.

Municipal Automatic System Proposed for Des Moines.

Harold D. Stroud, of Chicago, who has been investigating the telephone situation in Des Moines, Iowa, for a month, advocates a municipal automatic system for that city. He is quoted as stating that such a system can be established for $2,020,000, the system to have a capacity of 35,000 telephones with 21,000 installed.

The receipts, with the rates 25 per cent. lower than at present, will be about $588,000 a year. Mr. Stroud says all expenses can be paid, including interest, and 5 per cent. laid away in the depreciation fund, yet the city will make $136,000 a year net. This, he declares, will enable the city to make the plant pay for itself in 12 years.

From Factory and Salesroom

Conventions: North Dakota, Fargo, March 25, 26; Florida, Ocala, March 25, 26; Tri-State, Jackson, Tenn., May 19, 20

A Compact Soldering Outfit.

The Solderall Co., 143 Liberty Street, New York City, is putting on the market a handy, compact, complete soldering outfit consisting of a nickeled pocket, self-acting, alcohol blow torch with folding handle and a tube of Solderall. This torch is 6x2x1¼ ins and it is claimed will blow a hot blue flame about four inches long for over two hours.

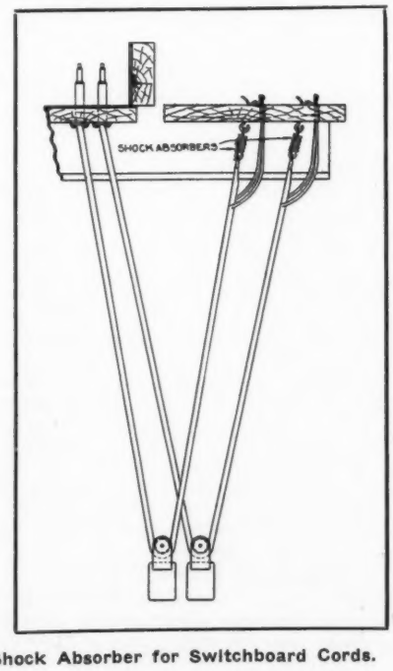
The company's object in putting this on the market is to popularize the use of Solderall which is a pure 50-50 metal

A Tube of Solderall.

solder (pulverized), combined with a non-corrosive flux, and to demonstrate its simplicity and the workmanlike finish of the job. The Solderall torch takes the place of the old-fashioned soldering iron. Solderall is put up in collapsible tubes as the easiest and most economical means of applying it to inaccessible places and prevents the dripping and waste of solder which is usual when stick solder is used.

The Stromberg-Carlson Shock Absorber.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has just put on the market a small device to insure a long life for switchboard cords. This device is simple and



Shock Absorber for Switchboard Cords.

is called "The Stromberg-Carlson Shock Absorber." The accompanying illustration shows two of these in use.

The object of this device is to relieve the switchboard cord of the strain that is put on it when a plug is released from the jack and falls back into place with a jolt. The strain thus put upon the cord is very great, owing to the heaviness of the cord weight. As may be seen in the illustration one end of the shock absorber is attached to the stay cord while the other end fastens to the stay cord hook.

An interesting pamphlet has been prepared on this subject and operating companies will do well to address the advertising department of the Stromberg-Carlson company for a copy.

Paragraphs.

THE F. BISSELL CO., Toledo, Ohio, is sending out the latest number of the Bissell Book, the company's house organ. One of the many features of the book is an article for the benefit of cross arm users regarding the difference between long leaf and short leaf pine. The Bissell Co. declares that it manufactures from nothing but 75 per cent. heart genuine long leaf yellow pine.

W. N. MATTHEWS & BROTHER, St. Louis, have recommended the use of large size guy anchors for temporary strains. Where pole lines run through river bottoms they can be saved from damage by spring floods by screwing down anchors eight, 10 or 12 inches in size. These can be screwed out again when they have performed their mission. A heading in TELEPHONY of March 14 inadvertently referred to small size anchors for this service.

THE LARSON BROTHERS LUMBER CO., operating at Winthrop, Minn., reports that although lack of snow and favorable weather conditions were adverse factors in hauling poles from the woods to the yards, it considers itself fortunate that practically all of its stock was successfully transferred. The company specializes almost exclusively in white cedar stocks and states it is in better position now to fill orders specifying various sizes than it has ever been before.

THE UTILITIES INDEMNITY EXCHANGE, St. Louis, Mo., composed of the operators of public utilities throughout the country, has received a strong endorsement by a committee of the Ohio Electric Light Association appointed, as a means of finding some relief from present insurance rates, to investigate the plan of reciprocal or inter-insurance afforded by the Utilities Indemnity Exchange. At a meeting at Columbus between the committee and President L. T. Block, of the Exchange, a plan was presented for fire and liability insurance for public utilities which promised a substantial reduction in the cost of the insurance. The committee after investigation recommends the Utilities Indemnity Exchange for reliability and honorable dealing and states the saving in premium averages about 40 per cent.

Advertising for Subscribers.

The Knightstown Telephone Co., of Knightstown, Ind., is a convert to advertising as a business builder for the telephone company. Under the caption "Save Time" in heavy display type, with a light border and plenty of white space, the company is saying "The man who has his place of business fully equipped with telephone service can save a great amount of time daily, and out-distance his slow-moving, letter-writing competitor."

The Home Telephone Co., of Goshen, Ind., is getting good results from a two-column, page deep advertisement carried in the local papers, which exploits the telephone directory as an advertising medium "right next to good newspaper advertising for efficiency and genuine value."

Legal Cases and Decisions

By A. H. McMillan

Continuous Labor.

"During February, 1913, I had occasion to look through some old copies of TELEPHONY. At that time I noted you cited a court decision, affirming that there was no infraction of the law where a night operator was allowed to sleep between calls, even though the hours she was on duty exceeded the hours of service law. I have since made careful search, but have failed to find the item in question. If you will supply the issue or any information, the favor will be very much appreciated.

November 25, 1911, in No. 22, Volume 61, of TELEPHONY, we answered a query on the subject you ask for, but did not cite any decision. The only decision ever cited on this question was United States vs. St. Louis & Southwestern Railway Co., 189 Federal 954, in which the federal hours of service act, making it unlawful for any interstate carrier by railroad to permit any employe to remain on duty longer than nine hours in any 24-hour period was construed. Under that act, an office which is closed each day of 24 hours, four times for periods of one hour each, only is to be classified as one continuously operated night and day. It was held that violation of this act is not avoided by dividing hours of service of the operator into two periods where the aggregate of hours of service of each day of 24 hours exceeds nine.

Increasing Rates.

"We have about 130 telephones in our exchange and no contract with our subscribers except a verbal agreement. We now wish to write contracts with each subscriber this spring. Can we legally write these contracts for $2 more than our present rates with a rebate clause if the rental is paid during the first 10 days of each quarter? Can we refuse our present subscribers service unless they sign our contracts? Some of these subscribers pay $12 per year for telephone and service; others pay $8 per year for line service, but own and maintain their telephones."

Section 10 of Act No. 206 of the Public Acts of 1913 of Michigan provides that no person, co-partnership, or corporation, owning telephone lines and facilities and rendering telephone service within the state, shall increase any rate, toll, rentals or charge or so alter any classification, contract, practice, ruling or regulation as to result in any incorrectness in any rate, toll, rental or charge under any circumstances whatsoever, except upon the application to the railroad commission and a finding by the commission that such increase is justified. Under this provision you could not legally write your contracts for more than the present rate, even with the rebate clause that you have in mind. The proper way to do will be to make an application to the railroad commission in accordance with that act and get its permission to make the increase you wish.

An Abandoned Telephone Line.

"Following is a case we would like to have discussed in the columns of TELEPHONY.

"About 15 years ago a telephone company abandoned a grounded telephone line five miles in length and allowed a smaller company to use the line. The receiving company in the meantime rebuilt all of the line except one and a half miles and strung new wire part of the way and has also a metallic circuit all the way on this pole line. The original owners had no paid right of way for the pole line, but the company now operating the line has. The original owners of this line sold to another company. Can that company now take possession of this line? There was no contract made relative to the use of the old line."

The purchasers of the line from the original owners can take possession of it. Failing to use it did not deprive the original owners of their property.

Does Sale of Farm Include Telephone Rights?

"Every once in awhile some of our rural friends, who have been living on co-operative lines, sell their property and quite often when they do so they forget, when making the deal, to mention that they wish to reserve the telephone and their share in the line. Our impression is that when no mention is made of the telephone and share when making the sale, the party making the sale loses title to both telephone and the line share. How about it? Are we right?"

We do not think you are right in your conclusion that the person selling the farm loses title to both telephone and share in the co-operative company. It has been held that stock in a rural unincorporated company is not transferable. Brenagan vs. Buchon, 122 N. Y. S., 610.

Memembership in a co-operative line is personally to the owner, so that there would have to be a sale of the telephone interest and also an acceptance of the purchaser by the co-operative company as a member before he would be entitled to the service.

Specific Performance of Telephone Lines.

The owners of a telephone exchange and certain lines of poles and wires sold, or leased for a term of 99 years, a particular line with 10 telephones and the wires, poles, etc., connected therewith. They agreed that for a period mentioned, the parties to whom the agreement was made and their heirs and assigns should be accorded, without fee or charge, full connection with the exchange and upon all lines in the county then owned and operated by the parties making the covenants; and this privilege and right was declared to be binding upon the assigns and heirs of the covenantors, so that it should be operative against all purchasers from them. The line leased was subsequently sold to other parties which had notice of the contract when they purchased. Suit was brought to obtain specific performance of this contract.

The court held that the agreement was not enforcible because it was not in the nature of an easement, or one running with the land, and did not bind the purchasing company, because it involved the exercise of skilled judgment and discretion continuous in character and running through a period of 99 years, thus requiring the protracted supervision of the court. There was evidence to show that the covenantors conveyed the exchange and property and placed it beyond their power to carry out the covenant, and that those holding by purchase under them refused to do so. Under this situation there was held to be enough evidence to submit the case to the jury for the purpose of determining whether the covenantors were liable in damages in lieu of specific performance. Greer vs. Pope, 79 Southwestern, 846.

Interfering With Shade Trees.

Although a city of North Carolina, for the purpose of its government and management may, in its discretion, cut down and trim trees bordering on streets, it cannot transfer its right of control over shade trees to an individual or quasi public corporation, such as an electric light company, which is authorized to use the streets. Such a company cannot invade the right of a property owner as to the trees in front of his property without paying compensation therefor. Where an electric light company invades such rights with wantonness, oppression or bad motive, the abutting owner may be awarded pecuniary damages. The damages recovered may be for the destruction of the trees, although the trimming was done in a skillful manner. So held the Supreme Court of North Carolina in an action brought against an electric light company in the city of Raleigh, for injury to shade trees standing along the sidewalk in the street. Moore vs. Caroline Power & Light Co., 79 Southeastern, 596.

Damage to Shade Trees.

Suit was brought against the Citizens Telephone Co. of Muskegon, Mich., for damages alleged to be wrongfully done by it to certain shade trees belonging to one Hoben, along the highway. The telephone company defended on the ground that it was not sued by its proper corporate name, which is "Citizens Telephone Company of Muskegon, Michigan." The supreme court refused to reverse a judgment against the telephone company on this ground, but did reverse the judgment, because it did not appear that service was made on an authorized agent of the telephone company. Hoben vs. Citizens' Telephone Co., 142 Northwestern, 1070.